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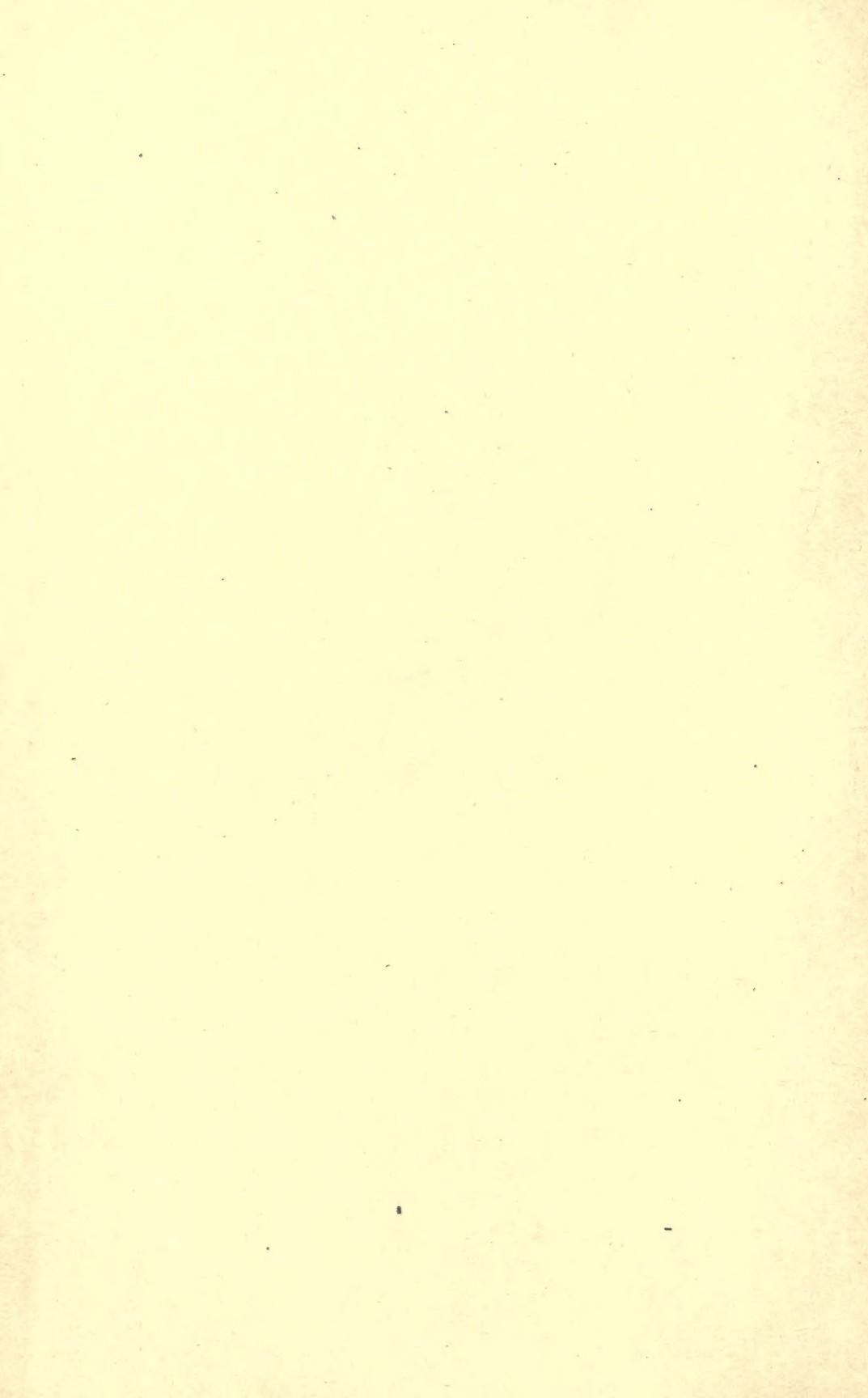
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Presented by

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~~John Cipriani~~

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THE
AMERICAN YEAR-BOOK
OF
MEDICINE AND SURGERY

BEING
A Yearly Digest of Scientific Progress and Authoritative
Opinion in all Branches of Medicine and Surgery
drawn from Journals, Monographs, and Text-
Books of the Leading American and Foreign
Authors and Investigators

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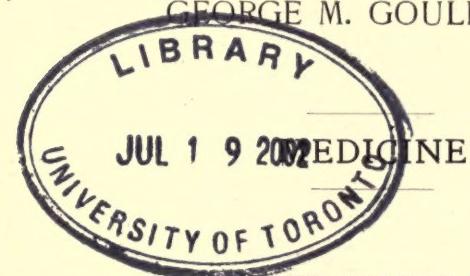
BY

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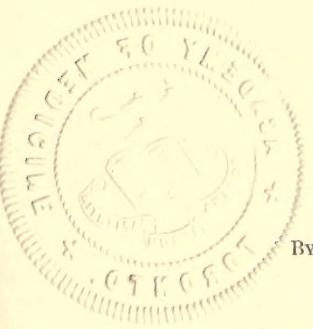
GEORGE M. GOULD, M.D.



PHILADELPHIA, NEW YORK, LONDON

W. B. SAUNDERS & COMPANY

1904



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PREFACE.

In the department of Pediatrics the subscriber will be glad to find that Dr. J. P. Crozer Griffith and Dr. J. Claxton Gittings have consented to serve as editors. They succeed Dr. Louis Starr and Dr. Alfred Hand, Jr., who have resigned. Drs. H. F. Hansell and Wendell Reber have found it impossible to continue in charge of the department of Ophthalmology, and Dr. Walter L. Pyle and Dr. Samuel Horton Brown have undertaken the editorship. I am also happy to have the aid of Dr. John Marshall and Dr. John H. W. Rhein in editing the literature of Legal Medicine. These new editors of departments are so well known as masters in their respective specialties that the reader will feel assured of the best workmanship and judgment. Grateful acknowledgment of indebtedness is due to the previous editors for their zeal and the excellence of their work; I regret that other duties have made their resignations necessary. We also regret the resignation of Dr. M. B. Hartzell from the section on Cutaneous Medicine and Syphilis. This department remains under the sole charge of Dr. Louis A. Duhring.

A special endeavor has been made this year, and will be continued in the future, to place at the head of each chapter a summary of the more noteworthy advances and discoveries made during the year. These, we are assured, will prove of use to the reader in fixing in the attention the special trends of progress in such a vast mass of literature as appears each year in every branch of medical science. The ever-increasing difficulty of gathering this to a focus has its compensation in the continued and increasing success of the YEAR-BOOK, despite many formidable rivals.

GEORGE M. GOULD.

PHILADELPHIA, *January, 1904.*

CONTENTS.

	PAGE
GENERAL MEDICINE	9
By ALFRED STENGEL, M.D., and D. L. EDSALL, M.D., Philadelphia, Pa.	
PEDIATRICS	240
By J. P. CROZER GRIFFITH, M.D., and J. CLAXTON GITTINGS, M.D., Philadelphia, Pa.	
PATHOLOGY AND BACTERIOLOGY	304
By DAVID RIESMAN, M.D., and A. O. J. KELLY, M.D., Philadelphia, Pa.	
NERVOUS AND MENTAL DISEASES	377
By ARCHIBALD CHURCH, M.D., Chicago, Ill.	
CUTANEOUS DISEASES AND SYPHILIS	415
By LOUIS A. DUHRING, M.D., Philadelphia, Pa.	
MATERIA MEDICA, EXPERIMENTAL THERAPEUTICS, AND PHARMACOLOGY	461
By REYNOLD WEBB WILCOX, M.D., New York City, and A. A. STEVENS, Philadelphia, Pa.	
PHYSIOLOGY	506
By G. N. STEWART, M.D., Chicago, Ill.	
LEGAL MEDICINE	530
By JOHN MARSHALL, M.D., Nat.Sc.D., and J. H. W. RHEIN, M.D., Philadelphia, Pa.	
PUBLIC HYGIENE AND PREVENTIVE MEDICINE	571
By SAMUEL W. ABBOTT, M.D., Boston, Mass.	
PHYSIOLOGIC CHEMISTRY	601
By WALTER JONES, Ph.D., and REID HUNT, M.D., Baltimore, Md.	

GENERAL MEDICINE.

BY ALFRED STENGEL, M.D., AND D. L. EDSALL, M.D.,
OF PHILADELPHIA.

GENERAL SUMMARY OF THE REVIEW OF MEDICINE.

THE past year has brought forth several facts that now seem to be of much importance, and has at the same time been rich in details that are of distinct interest. The most important contributions that are likely to have permanent value have been in the field of infectious and parasitic diseases, and it is in the study of these diseases that Americans have been particularly active. We may well feel pride in the scientific productiveness of our countrymen; for in the studies of the class mentioned Americans have in the past year certainly made more progress than have the workers of any other nation. Next to infectious diseases, investigators have been most active in the study of abnormalities in metabolism, though the recent results of the work in the last-mentioned field, while frequently suggestive and of interest, are in but few instances such as to make it likely that they will be of great permanent importance.

Among the details in our present review of medicine to which attention may be especially directed are the following:

Among the infectious diseases, paratyphoid infections have been reported in multiplying numbers, and this has now become a distinct and generally recognized group of cases with definite clinical characteristics; and the knowledge of such cases that we now have is likely to be a great aid in explaining some previously obscure attacks that resemble typhoid fever closely except that typhoid Widal reactions are negative. In tuberculosis there has been great activity in investigating the question of the intercommunicability of human and bovine tuberculosis, Ravenel having added important facts to his previous observations, and having been seconded by Pearson and Gilliland, Behring, Wolff, and others, to such an extent that there seems now no reasonable doubt as to the lack of wisdom and propriety in Koch's celebrated paper at the London Congress. Workers in the field of tuberculosis have also been greatly stirred by the papers of Behring and of Pearson and Gilliland, on the production of artificial immunity in cattle; the economic interest of the question is enormous, and there is a hopeful suggestion given by this work of the possibility of a future specific treatment or prophylaxis in human beings. Pneumonia has also occupied a good deal of attention in this country, on account of the increasing recognition of its growing prevalence, and

particularly because of its terrible epidemic ravages in Chicago. It is likewise striking to observe the increasing number of reports of pneumococcic infections other than pneumonia. Interesting communications concerning the etiology of rheumatism have been reported, though the work as to the character of the infection is not yet conclusive. A somewhat hopeful aspect is given to this work by Menzer's report on a specific antiserum for rheumatism. The general interest in smallpox is maintained by the persistence of the epidemics throughout the country, and has been rendered acute by the observations of Councilman, Magrath, and Brinckerhoff on the bodies found in the cells in this disease; they consider that they have demonstrated that these bodies are protozoa and are etiologic factors in smallpox and in vaccinia. They describe them as passing through two definite life-cycles in variola, while there is but one cycle in vaccinia; this fact, they think, causes the characteristic differences in the clinical courses of the two diseases. That interesting disease, the spotted fever of the Rocky Mountains, has been carefully studied by Wilson and Chowning, with productive results as to its etiology; and the mysterious African disease, sleeping-sickness, has been actively investigated, with the result that two claims in regard to its etiology have been advanced within the year, the one relating to the trypanosoma being the more interesting.

In metabolic affections there have been some observations of decided clinical importance upon levulosuria, and some important contributions on glycolysis and the etiology of diabetes; the facts of greatest clinical importance under this heading are, however, those that have been brought forward in relation to the effect of various forms of fat in the diet. The paper by Minkowski on gout, as yet chiefly of technical interest, contains a germ of truth that is perhaps capable of great productiveness. Some interesting observations on rheumatoid arthritis have been advanced by Jones.

The section on diseases of the blood contains an extremely suggestive article by Freymuth; a massive piece of work by Rosenqvist, chiefly on Bothriocephalus anemia; an unusual number of cases of chloroma; and the perennial discussion as to the nature of leukemia. The section on cardiovascular diseases is chiefly noteworthy in the interesting general discussion of pericarditis with abdominal effusion, by Kelly; and an article by Neusser, on abdominal symptoms in arteriosclerosis, the latter being a subject that deserves more attention than it has hitherto received.

Under the heading of pulmonary diseases the papers of chief interest are those relating to the origin of the normal pulmonary physical signs, those discussing the simulation of abdominal disease by acute disease of the lungs and the pleura, and Delafield's paper on the early tapping of pleural effusions.

The section on diseases of the digestive tract includes a striking article by Kuckein on esophageal carcinoma simulating aneurysm of the aorta, and a series of interesting articles concerning gastrectasia, gastrop-tosis, and gastric ulcer; and there are suggestions concerning the diag-

nosis of gastric cancer, a subject that may also be found mentioned in the section on diseases of the blood, in relation to the resistance of the red blood-cells to nonisotonic solutions. The question of spastic obstruction has received considerable attention. There are a number of papers of consequence upon cirrhosis of the liver and diseases of the biliary tract; and disorders of the kidney have been studied with considerable activity, the papers of Kuttner and Lüthje, on albuminuria, being of decided value, and those on the hemolytic reaction in uremia of interest. Strauss's paper on cryoscopy, coming from one who has himself done so much work upon the question, is impressive in demonstrating how unsatisfactory is that method of investigating most renal disorders. The papers of greatest practical interest on renal conditions are, however, undoubtedly those of von Noorden and his students, on metabolism in nephritis, with their consequent conclusions as to the diet—conclusions that are likely to cause decided general changes in the methods of dieting the subjects of such disease.

The section on parasites contains the striking new observation of Dutton, with similar reports by others, on the presence of trypanosomes in the blood of human subjects, these parasites appearing to be, in some instances, at least, the actual cause of the symptoms. Observations on this point will be found also under the heading of sleeping-sickness. Finally, this section contains a review of the articles of Stiles and others, which are the most important to Americans, particularly to those in the southern part of this country, of all the articles reviewed this year; for Stiles has apparently established the existence of an especial American variety of *Uncinaria*, and has shown its frequent occurrence and its importance in causing prolonged ill health, incapacity for work, and ultimately death in a large number of the inhabitants of the southern regions of this country.

INFECTIOUS DISEASES.

TYPHOID FEVER.

M. T. Sudler¹ discusses the recent **epidemic of typhoid fever in Ithaca**, New York. The number of cases known to have occurred is 681, with a mortality of 51. It was impossible to get absolute figures. The author particularly directs attention to the fact that the infection occurred in persons supplied with drinking-water from the "Six-Mile Creek" source, while there were practically no cases among those that used the city water from other sources or among those that used wells; and when boiled water was used, no cases occurred. He likewise emphasizes the fact that the residents of Ithaca had been warned many months previously of the danger of using the infected supply, since chemical and bacteriologic examination had shown the water to be unpotable. Had the citizens and the city authorities acted upon the knowledge that was already at hand and made public, the whole outbreak could have been prevented.

¹ Phila. Med. Jour., April 11, 1903.

P. Horton-Smith¹ reports an interesting series of cases, apparently instances of **direct household infection** with typhoid fever. One case appeared, and was followed by 8 others among the family and relatives that had come into direct contact with the first patient. All of the 8 had apparently been infected from the first case except 2, who had probably been infected from some of the later cases. [We have, within 3 months, observed, in hospital practice, 3 separate instances in which 4 cases of typhoid fever occurred in each of the 3 families. In one family there were probably one or two other cases. In one of these instances it is probable that the infection had been transferred from patient to patient; though this could not be positively determined. In the other instances it is probable that it was an ordinary infection from milk or water.]

A. Hamilton² contributes an interesting study of the **conveying of typhoid fever by means of the house-fly**. She has studied the recent epidemic of typhoid fever in Chicago from this standpoint. After investigating other possible sources of infection, she reached the following conclusions: The epidemic was by far most severe in one ward. This fact was not to be explained by contamination of the drinking-water or the food, or on the ground of mere ignorance and poverty. The street sewers in this ward are too small, and only 48 % of the houses have sanitary plumbing, the remaining having either defective plumbing or being provided with privies, with or without sewer-connection, and without any water-supply. The incidence of typhoid fever was in direct relation to the unsanitary condition of the region in which it occurred. Flies caught in undrained privies, on the fences of yards, on the walls of houses, and in the room of a typhoid-fever patient, were used to inoculate 18 culture-tubes. From 5 of these tubes the typhoid bacillus was isolated. The author considers that when sanitary arrangements are defective, flies may be an important agent in the dissemination of typhoid fever.

D. Turner³ refers to the importance of flies in transmitting typhoid fever, and mentions a series of cases that occurred in a few houses situated close to each other and next a gutter into which emptied the slops from the kitchen and bedroom of a house in which there was a case of that disease. No other source of infection than this gutter could be found. The author describes another series of cases that occurred in a cluster of houses; and also a series that occurred throughout 6 years in a set of about 30 houses, all of which were likewise situated along a drain. Hardly more than 3 of these houses had escaped typhoid fever during this period of 6 years. The first patient came from elsewhere, and was taken sick in one of the houses. The bedroom and kitchen slops were emptied into the drain above mentioned. The author indicates that **flies probably carried the disease** in these instances. He mentions another series of cases, in which it was determined that the disease had been acquired by using the water from an underground tank that had been

¹ Lancet, April 11, 1903.

² Jour. Am. Med. Assoc., Feb. 28, 1903.

³ Australasian Med. Gaz., Feb. 20, 1903.

contaminated from a drain near by, which had become stopped, when its fluid had backed up into the tank. The author recommends tar as a disinfectant.

Symptomatology.—H. Benedict and N. Surányi¹ claim priority in the observation recently reported in the same journal by Svenson, that typhoid convalescents exhibit a very remarkable **excitation of the oxidative processes.** The authors report some prolonged and careful observations of metabolism in typhoid-fever convalescents, and state that the two peculiar characteristics of metabolism in these circumstances are the very striking excitation of the oxidative processes, which causes the patient, in the period immediately following the disease, to put on less fat than a normal person would on the same diet; and the very peculiar reduction in nitrogen-metabolism. The latter seems to be due to an exhaustion of the functions concerned in nitrogen-metabolism, rather than to mere retrenchment after loss; for nitrogen-metabolism cannot be excited into greater activity by causing greater demands upon it.

C. A. Ewald,² in discussing **atypic typhoid fever**, states that the **typhoid encountered in Berlin has grown less grave** during recent years. There is occasional difficulty in diagnosing it from acute miliary tuberculosis. The author mentions the occurrence of splenic tumor in the latter condition, and the occasional occurrence of spots practically indistinguishable from those of typhoid fever. In speaking of the Widal reaction, he says that he considers that a positive result only is of value. The **diazo reaction was entirely absent** in 29 of 56 cases. He mentions a case that ran for some time with the general appearance of an acute endocarditis, but proved to be typhoid fever. In another case there were all the typical symptoms of typhoid fever, including enlargement of the spleen, spots, and the diazo reaction; and yet the case proved to be a streptococcic endocarditis. He then mentions some cases of **very acute dysentery without stools of a dysenteric character.** During the last few years he has seen 4 cases of this character, which could readily be mistaken for typhoid fever. He notes a case that had a violent onset, with hallucinations, delusions of persecution, and general severe nervous excitement, and with marked pulmonary signs; this case proved to be typhoid fever. In discussing the treatment, he states that he uses cold baths; but also, to some extent, employs antipyretics, such as pyramidon and lactophenin. He especially prefers quinin, given in doses of 15 grains 2 or 3 times a day. In cases with grave nervous symptoms he believes these drugs have a good influence. In dieting he is less afraid of giving the patient insufficient nourishment than he is of **overtaxing the digestive and assimilative functions.** He has known of no instance in which a typhoid-fever patient has died on account of insufficient food. He gives, however, preparations such as tropon and somatose with milk, softened double-baked bread, or zwieback, and thickened soups, together with some egg-albumin.

C. Oddo and V. Audibert³ give a general discussion of **dicrotism** in

¹ Zeit. f. klin. Med., Bd. xlviii, Hefte 3 u. 4.

² Berl. klin. Woch., Jan. 26 and Feb. 2, 1903.

³ Gaz. des Hôp., No. 78, 1902.

typhoid fever. They studied 50 cases, finding dicrotism present 34 times. It was more common in severe than in mild cases. It appeared most commonly at the beginning of the attack, though by no means always. It is, however, an element of some importance in the early diagnosis. Occasionally it is only temporary, and the authors describe both a continuous and a remittent form. The dicrotism decreases toward the end of the attack, although a secondary dicrotism sometimes appears. It is increased by sudden rises in temperature. The dicrotism bears a close relation to the blood-pressure. If the blood-pressure is much increased or decreased, the dicrotism usually disappears; and it may disappear, also, if there is marked cardiac disturbance. Dicrotism in typhoid fever is due to the cardiac erethism, and to the reduction in the arterial contractility and in the arterial pressure.

R. Bernert¹ has made a study of **acetonuria in typhoid fever.** Of 94 cases, he found it present in 11, not only during the continuance of the fever, but in the stage of normal temperature during convalescence. In the latter circumstances it is chiefly the result of subnutrition, as is evidenced by the fact that if the patients are given food freely, the acetonuria disappears at that stage. Subnutrition is not the sole cause of it, however. Were it so, acetonuria should be found in most of the cases.

Weichardt² discusses **general septicemia from typhoid bacilli;** and reports a case in which there were practically no anatomic changes characteristic of typhoid infection, but in which typhoid bacilli were found in large numbers in the liver, spleen, and mesenteric glands. He insists upon the importance of such cases in relation to public health, as they are very likely to cause a spread of the disease, owing to the fact that the typhoid fever is likely to be unrecognized.

Complications.—L. M. Warfield³ reports a case of typhoid fever with **3 relapses**, the patient having been admitted during the original attack in the early part of August, and not having been free from fever until the beginning of December. He refers to the view that in an original attack the small intestine bears the brunt of the disease, while in a relapse the large intestine chiefly suffers. The autopsy records in the Johns Hopkins Hospital were studied in regard to this point, and the conditions found do not at all support this view.

Follett⁴ describes a case of typhoid fever with 3 relapses, lasting, in all, 3 months. The patient had had tub-baths, but never more than 3 in 24 hours; 225 baths had been given in all. There was decided cardiac weakness; and the signs of marked neuritis developed in the lower extremities, but disappeared after they had been present for about 3 weeks. After this, the skin, instead of being pallid, became cyanotic—particularly at certain times of the day, and especially after baths. The cyanosis was more bluish than one would expect it to be from circulatory weak-

¹ Zeit. f. Heilk., Bd. iii, Heft 2; Abt. f. inn. Med., Heft 1.

² Zeit. f. Hyg. u. Infek., Bd. xxxvi, S. 440.

³ Johns Hopkins Hosp. Bull., July, 1902.

⁴ Gaz. hebdom. de Méd. et de Chir., No. 61, 1902.

ness. There developed, also, symmetric, broad, **black bullas**, as large as a dollar, behind the malleoli. The pulse in the dorsalis pedis artery could not be felt. The author considers this a case of **Raynaud's disease**, the development of which was probably greatly influenced by the baths. There was persistent slight edema of the legs; and this, with the absence of pulse in the dorsalis pedis, led the author to believe that there was a more or less **diffuse, obliterating endarteritis**.

J. N. Henry¹ reports 4 cases of **fecal impaction** in typhoid fever, and directs attention to the fact that this is much more common than the usual descriptions of the disease indicate. He insists that diarrhea may accompany the impaction and may divert suspicion from the real condition of affairs. One case in particular makes it evident that overdosing with milk, especially in the case of children, may be an important etiologic factor.

Véron and Busquet² discuss the possibility of a **peritonitis in typhoid fever through direct extension**; and report a case of ambulatory typhoid fever in which the clinical appearance was at first that of appendicitis, but in which the diagnosis of typhoid fever was established by the Widal reaction. The patient was admitted with peritonitis. Operation was unsuccessful, and death occurred. Autopsy showed no perforation of the intestine and no suppurating mesenteric gland, but extensive deep ulcerations of Peyer's patches in the neighborhood of the cecum. There was a peritonitic exudate in which typhoid bacilli were found, as they were also in the liver and spleen. The authors believe that it has been demonstrated by animal experiment that typhoid bacilli may pass the normal intestinal wall and produce a purulent peritonitis, in which one may find a pure culture of typhoid bacilli. [One of us has recently observed a very similar case that recovered, the patient having been admitted because of the sudden onset of what was thought to be appendicitis, but which proved upon operation to be typhoid fever with peritonitis without perforation. Drainage and the inversion of 2 very deep ulcers, the serous surfaces of which were covered with exudate, produced a rapid recovery.]

R. J. Dwyer³ reports a striking case of typhoid fever in a woman of 21 years, who gave a history of having swallowed a small cuff-holder 2 days before her admission, after which she had had severe epigastric pain. On the evening before admission, there had been **severe hematemesis**. During the next 4 days she had 6 hemorrhages from the stomach, and on one day the stools were dark. For 9 days the temperature fluctuated between 98.4° and 99.4°, once rising above the latter point. After this time, it rose to 102°, and persisted at this point or above until death occurred, which was after 2 weeks. The temperature remained always at one level. During this latter period the patient developed all the signs of typhoid fever. The red cells were 1,500,000; the whites were not increased. Postmortem examination showed the lesions of typhoid fever; and in the stomach was a shallow, apparently healed ulcer.

¹ Am. Jour. Med. Sci., July, 1902.

² Rev. de Méd., 1902, p. 366.

³ Canad. Pract. and Rev., April, 1903.

F. Glaser¹ discusses the importance of the **typhoid bacillus in diseases of the respiratory apparatus** occurring in typhoid fever, and also the appearance of the typhoid bacillus in the sputum. He refers freely to the recent literature, and decides that it has been demonstrated, in every instance in which satisfactory studies were made except one, that the pneumococcus was present in the sputum or in the lung, whether typhoid bacillus was present also or not. He then refers to a case in which pneumonia appeared during the course of typhoid fever, and in which typhoid bacilli were found in sections made from the lung after death and also in the blood aspirated from the lung during life; but there were numerous pneumococci also. In another case, in which recovery occurred, typhoid bacilli were found in the sputum in enormous numbers and persisted for 2 weeks. The author directs attention to the **importance of the infection of the sputum** in cases of this sort, **in relation to public health**; and he refers to a few other cases in which it has been definitely demonstrated that typhoid bacilli were present in the sputum. He believes that it has been shown that in practically all instances pneumonia in typhoid fever is due to a secondary infection—almost always with pneumococci. He then calls attention to the fact that pneumonia in the course of typhoid fever is usually of a markedly hemorrhagic character. Nevertheless, the occurrence of a marked amount of blood in the sputum is not a sufficient demonstration that a pulmonary process is pneumonia, as **pulmonary infarct is not uncommon in typhoid fever**. He describes a case in which it was extremely difficult to determine whether the pulmonary condition was infarct or pneumonia. There was, later, a pleural exudate, which became slightly hemorrhagic, and subsequently purulent. It contained virulent typhoid bacilli. A rapid recovery occurred, however, after aspiration. Typhoid empyema has a very satisfactory prognosis. As a further example of the importance of remembering that hemoptysis in this condition may be due to infarct, as well as to pneumonia, the author refers to the case of a boy of 17 that exhibited bloody expectoration and had dulness in the left upper lobe, with marked crepitus. The postmortem examination showed infarct, with a pyocyaneus infection. The cause of these secondary infections in typhoid fever cannot be definitely given in all cases. Undoubtedly, in some instances, however, the prolonged period of incubation and the weakness that it produces in the patient give opportunity for the secondary infection. These mixed infections make the prognosis decidedly worse. The question as to whether typhoid bacilli ever cause lobular pneumonia, the author leaves an open one.

Memmi² describes the case of a woman of 36 years who had **gallstone colic** some months after typhoid fever. Soon after this she developed a pneumonia of the right lower lobe, with all the characteristic appearances of lobar pneumonia. Bacteriologic examination of the blood and of fluid obtained by **puncturing the lung** showed the presence of **characteristic typhoid bacilli**. The author believes that he demonstrated that the

¹ Deut. med. Woch., Oct. 23 and 30, 1902.

² Gaz. degli Osped., 1902, No. 141.

pneumococcus was absent; he thinks that this case is one of those that clearly show that the **typhoid bacillus may produce a pneumonia**.

G. C. Sears¹ discusses **pleurisy in typhoid fever**, and adds 18 cases from the Boston City Hospital to the records recently collected by Remlinger. These, with a few others overlooked by Remlinger, make a total of 57, of which 48 were males and only 9 were females. Unless the condition occurs in the very beginning of the disease, it is likely to be seen only in the late stages. Its onset is usually insidious, and its presence is discovered only by physical examination. Of those that were aspirated, 16 were serous, 17 purulent, and 7 hemorrhagic. In some cases it was possible that the typhoid bacillus had caused no localized lesions except in the pleura. In 2 instances this, the author thinks, was definitely the case. In both of these the typhoid infection was secondary to tuberculosis. Emboli have been shown to have been, in some cases, the carriers of the infection of the pleura. The condition does not seem to cause any distinct increase in the number of leukocytes, unless the effusion is prolonged. It does not increase the gravity of the disease to any notable degree, unless pyothorax develops.

J. K. Fowler and A. G. R. Foulerton² reported to the Medical Society of London 2 cases of **hemorrhagic typhoid fever**, the first being one of **pure infection with the typhoid bacillus**, as demonstrated by blood-cultures intra vitam and by cultures taken after death. The coli communis was found, in addition to the typhoid bacillus, in the second case. The first observation seems to show that the view that a general hemorrhagic tendency in typhoid fever is always due to a secondary infection is incorrect. In neither case was the Widal reaction present. The authors think that this indicates that its absence is of grave prognostic importance. Both of these cases ended fatally.

J. Ettinger³ reports a case of hemorrhagic typhoid fever with **coincident general infection with Staphylococcus aureus and the colon bacillus**. The patient was admitted in coma, exhibiting many petechias scattered over the whole body; also ecchymoses, furuncles, and crusts. Necropsy showed the anatomic changes of typhoid fever, and bacteriologic study showed that this was complicated with a general staphylococcus and colon-bacillus infection. The staphylococcus was found in the pus of the pustules and furuncles and in the blood; the colon bacillus, only in the blood. The Widal reaction was positive in dilutions as great as 1 : 250.

J. Jacobi⁴ has investigated 35 cases of typhoid fever for the presence of **typhoid bacilli in the urine**. He found them in 7 cases. All of the 7 showed albuminuria; but the author believes that the literature indicates that it is **not necessary for the kidney to be diseased**, in order that the bacilli may pass through it. In one instance they appeared on the eighth day; usually, however, they are found in the second or third week. These cases exhibited numerous spots; and the author is inclined,

¹ Boston M. and S. Jour., Dec. 4, 1902. ² Brit. Med. Jour., Feb. 28, 1903.

³ Spitalul, 1903, No. 1; Zent. f. innere Med., 1903, p. 405.

⁴ Deut. Arch. f. klin. Med., Bd. lxxx, 1902.

chiefly for this reason, to believe that a bacilluria indicates a free circulation of bacilli in the blood. All the cases terminated in recovery. Bacilluria appears to have no prognostic importance; it is important chiefly from a hygienic standpoint.

E. Fuchs¹ has investigated the frequency of **typhoid bacilluria** and the influence upon this produced by administering urotropin. He found that of 75 cases of typhoid fever, 26 showed bacteriuria. In 12 of these the infection was with typhoid bacillus. In these cases urotropin had not been used. In a series of 40 cases in which prophylactic treatment with urotropin had been used, bacteriuria was found but once, in spite of prolonged and repeated examinations.

MacConkey² reports a case of right-sided **mammary abscess** in a typhoid-fever patient 38 years of age. The pus contained large numbers of typhoid bacilli.

F. A. G. Murray³ reports a case of typhoid fever that ended fatally with **Ludwig's angina**, which had produced **edema of the larynx**; and another case, in a child of 8 years, in which round-worms were occasionally passed and in which there were severe attacks of **abdominal colic**. This patient had violent abdominal pain on December 3. She had first been seen on November 10, and died on March 5. Postmortem examination showed 2 healing ulcers of the ileum with adhesions about them; and the author thinks that these ulcers had perforated on December 3. Erysipelas was the immediate cause of death.

Lorenzoni⁴ reports a case of **gangrene in typhoid fever**, which was produced by **thrombosis of the right common iliac**, extending into the external iliac and femoral arteries. He believes that such thromboses are due to the action of the typhoid bacillus on the vessel-walls; cardiac weakness, vasomotor changes, and changes in the blood he believes play a role of only secondary importance. The author found **typhoid bacilli present in the vessel-wall** where the inflammatory changes were most pronounced.

C. E. Nammack⁵ reports a striking case of typhoid gangrene in a man of 29 who had the usual prodromal symptoms of typhoid fever, beginning October 12. He felt better under treatment, and was allowed to be up a little on the 30th. Next day he was admitted into the hospital, with coldness and diminishing sensibility of the feet, and it was noted that the blood clotted rapidly. The day following, November 1, the feet were discolored and there was no pulsation in the arteries of the legs. The discoloration rapidly ascended to the upper fourth of each thigh. Rectal examination showed no pulsation in the internal pudic arteries. There were severe pains in the ankles. **Blood-cultures were sterile.** After this time there was a rapid advance of moist gangrene, and the patient died on November 14.

T. McCrae⁶ reports a case of **typhoid fever associated with trichin-**

¹ Deut. Arch. f. klin. Med., Bd. lxxvi, Hefte 1 u. 2.

² Brit. Med. Jour., Sept. 13, 1902.

³ Amer. Med., Mar. 9, 1903.

⁴ Gaz. degli Osped., 1903, No. 8.

⁵ Med. Rec., Dec. 27, 1902.

⁶ Am. Jour. Med. Sci., July 2, 1902.

osis and eosinophilia. The diagnosis of typhoid fever was apparently dependent upon the occurrence of rose-spots, enlargement of the spleen, and "a moderately marked Widal reaction somewhat late in the disease." The eosinophilia suggested trichinosis; but though this was looked for, even in sections of a muscle, it was not found at first. Later, however, another portion of muscle showed trichinas. The staining reactions of the blood were peculiar, in that there apparently were all grades of cells between typical neutrophiles and typical eosinophiles. These intermediate cells, however, disappeared after a time.

Hrach¹ reports the case of a convalescent from typhoid fever, 23 years of age, who suddenly had a convolution during the night. The following morning the pupils were found to react slowly, there was entire aphasia, and all the extremities could be moved only with great difficulty. A paralysis of the right half of the body, including the hypoglossus and the facial, gradually developed. The left pupil was contracted in the beginning, but later was dilated and did not react. There was divergent strabismus of the left eye. The patient gradually improved; and 4 weeks later all symptoms had disappeared.

Daboud² discusses the **meningeal forms of typhoid fever**, and divides them into 3 groups. In the first of these the usual symptoms of typhoid fever are present, with associated meningeal signs; in the second the meningeal symptoms dominate the whole clinical picture, but the disease is likely to be mistaken for uremia or other disease associated with marked cerebral symptoms; and in the third the clinical picture is that of a direct cerebrospinal infection. The author discusses the importance of lumbar puncture and the examination of the cerebrospinal fluid, in determining the presence of cerebrospinal infection, typhoidal or otherwise. He remarks upon the occurrence of Kernig's sign and its importance in typhoid fever, considering that when it is present a fatal result is 3 times more frequent than in cases in which it is absent. Cases that exhibit this sign are also much more likely to develop relapse. These cases, he considers, do not stand cold baths well; warm baths give better results. He believes, likewise, that warm baths are valuable in the treatment of cerebrospinal fever.

M. Chavigny³ states that there are few observations of a combination of **typhoid fever and tuberculous meningitis**. He reports such a case in a soldier of 22 years that had, at first, the characteristic symptoms of typhoid fever. In the second week he exhibited paralysis of the oculo-motor, and 2 days later there were distinct meningeal symptoms. Lumbar puncture showed a fluid in which the lymphocytes constituted the greater number of the cells. This led to a probable diagnosis of tuberculous meningitis. At this time diarrhea was succeeded by constipation. The patient died in the third week. Necropsy showed both typhoid fever and tuberculous meningitis, the typhoid ulceration not being far advanced.

Diagnosis.—H. Schottmüller⁴ discusses the **bacteriologic diagnosis**

¹ Wien. med. Woch., No. 42, 1902.

³ Rev. de Méd., 1903, p. 359.

² Thèse de Paris, 1902.

⁴ Münch. med. Woch., Sept. 23, 1902.

of typhoid fever. He found **bacilli present in the circulating blood in 84 %** of his cases. For cultures, he withdraws about 20 cc. of blood, using agar as a culture-medium, and taking 60 cc. of agar to 2 cc. or 3 cc. of blood. In this case he found the bacilli as early as the second day. In another instance he found them present on the first day of a relapse. In this case they were apparently present as the result of reinfection, since they usually disappear from the blood at least as soon as the temperature falls. The author believes that many of the **sudden, brief elevations of temperature** that occur during convalescence from typhoid fever are **due to abortive relapses**, as he has repeatedly found typhoid bacilli in the blood in such circumstances. As a rule, the **severity of the disease is proportionate** to the number of colonies of typhoid bacilli obtained; but this is more particularly true when, upon repeated cultures, it is found that the number of colonies is increasing. The author considers the bacteriologic blood-examination **more valuable than the Widal reaction**, since positive results are usually obtained much earlier.

A. J. Wolff¹ describes a **new method of applying the Widal test**, which consists in adding feces to bouillon, which should have an alkaline reaction of 1 % or 2 % to decinormal acid, using phenolphthalein. The bouillon is incubated for 12 hours, and the agglutination-test is then used with the blood of the patient and with typhoid blood that is known to agglutinate an ordinary pure culture of the typhoid bacillus. If agglutination occurs, with any of the bacilli in the culture, typhoid bacilli may be considered to be present. The author believes that those that teach that the bacillus is absent from the feces for the first 10 days or so of the disease are in error. He thinks that it is **usually present in the feces before the appearance of any distinctive symptoms**. So far, in 35 tests made by this method, every case that reacted positively proved to be typhoid fever.

Kölzer² has studied 32 typhoid cases in relation to the Widal reaction. He emphasizes the fact that there is **no definite line to be drawn between a positive and a negative reaction**. When there is agglutination, but no loss of motility,—particularly at a dilution of 1:50,—the reaction should not be called negative. The time within which the reaction occurs is also decidedly varied, even in positive cases. A negative result means nothing definite; a positive reaction, the author considers extremely important.

J. S. Billings, Jr.,³ discusses the results of the Widal tests performed at the laboratory of the **Health Department in New York city** during the year 1901. A positive result was considered to be present when there was well-marked clumping and loss of motility within 10 minutes, at a dilution of 1:20. In every case in which the laboratory finding was negative and the clinical diagnosis was typhoid fever, the case was investigated, if possible; and facts were received concerning 266 such cases. He examined 1908 specimens in all: 304 cases showed a positive reaction,

¹ Am. Jour. Med. Sci., April, 1903. ² Zeit. f. Hyg. u. Infek., Bd. xxxvi, p. 75.

³ N. Y. Med. Jour., Oct. 25, 1902.

88 % of these not having shown the reaction until the end of the first week of the disease. The author notes that the reaction **may be present for one or two days only**—one case, after 8 negative reactions, having shown a positive reaction at the end of 2 weeks; but the reaction became negative again on the next examination, and remained so until the end of observation. A doubtful reaction was shown in 164 cases; 39 proved not to be cases of typhoid fever, 33 were typhoid, and 92 could not be followed. The doubtful reactions were not due to taking the specimens too early in the disease. Besides the 33 doubtful reactions in typhoid cases mentioned, there were 78 cases that failed to show a reaction, but proved subsequently to be cases of typhoid fever; the total practical failures being, then, 111. In 76 % the blood was examined before the end of the first week. The second examination, however, proved negative in 43; and the third, in 22 cases. In one case 6, and in another 9, tests were made, always with negative results; the autopsy proved the correctness of the diagnosis of typhoid fever. Thirteen specimens were examined for paratyphoid agglutination, with 6 different strains of paratyphoid bacilli. No positive result was obtained. [It is worth while to emphasize the fact that the Widal reaction can never be said to be entirely absent until the case has been followed well into convalescence. As a striking example of this, it may be mentioned that in a case recently under the observation of one of us, positive blood-cultures were obtained during a brief primary attack, as well as during a short relapse. The patient was in the hospital, altogether, for 68 days; and repeated Widal tests were negative until the day before discharge, when a perfectly typical reaction was obtained. A reaction made 2 days before this had been doubtfully negative. Agglutination-tests with 4 strains of paratyphoid bacilli and 1 strain of colon bacilli had proved negative up to the end of the case.]

J. S. Billings¹ refers to the **diazo reaction** as carried out by the Health Department of New York city in 1902. Specimens from 369 cases were examined. The author considers that the examining of the urine in suspected typhoid fever is of value if its limitation is recognized. The diazo reaction is more constantly present than the Widal reaction, and is of importance chiefly from a negative standpoint. It occurs at least 48 hours earlier than the Widal reaction, but disappears much earlier.

Nizzola,² in a study of the diagnostic and prognostic value of the diazo reaction, states that his experience with it in typhoid fever indicates that it has a definite diagnostic value. He has never seen it absent in typhoid. [See Ewald's statement under "Symptomatology." We have repeatedly seen it persistently absent.] As to its prognostic value in pulmonary tuberculosis, its presence indicates a rapid and unfavorable course; its absence indicates nothing.

E. Adler³ discusses the early diagnosis of typhoid fever by **puncture of the spleen**. He speaks very scornfully of those that think the procedure dangerous, and says that they have made their statements on the basis

¹ N. Y. Med. Jour., April 18, 1903.

² Rif. med., 1902, Nos. 118 and 119.

³ Deut. Arch. f. klin. Med., Bd. lxxv, Heft 6.

of extremely imperfect evidence. He believes it to be without danger for the patient, if he is kept entirely quiet for 24 hours afterward, baths not being given, the spleen not being palpated, cough being controlled, and an ice-bag being placed over the spleen. [All these regulations are evidence that he himself considers that there is danger in the procedure. We know of 2 instances, probably 3, in which it has been the direct cause of death.] The author claims that in more than 90 % of cases it provides a **certain and rapid method of diagnosis**. As to the Widal reaction, he states that it makes little difference whether this reaction is obtained in a dilution of 1 : 10 or in higher dilutions; the main point is to **determine whether the reaction is increasing in intensity**. If one finds it at 1 : 1 at the first investigation, and a few days later at 1 : 10, one can, he believes, state definitely that the reaction is positive. He considers it extremely important in the diagnosis, when positive; but it is, of course, likely to be absent in the early stages, and is not of great importance in early diagnosis.

Prophylaxis.—A. Crombie¹ reports some further statistics regarding the effect of **inoculations against typhoid fever** in South Africa, especially referring to the question of age. He thinks it possible that double inoculation is excessive, and diminishes the resisting power. The disease occurred twice as often among those twice inoculated as among those but once inoculated. The author believes that the effects of the inoculations demonstrate a positive influence, particularly during the period of greatest susceptibility.

Treatment.—F. X. Walls,² in discussing the **dietetic management** of typhoid fever, refers to the **danger from the use of ordinary market-milk**. He mentions the bacteriologic examinations made for him by Gehrmann of 50 specimens of milk collected from milk-wagons in Chicago. Only 3 specimens showed under 100,000 bacteria per cubic centimeter; 37 contained over 1,000,000; the **average was over 260,000**. These examinations were made in midwinter. Similar figures have been found in other large cities. The author believes that milk as the sole food is objectionable in typhoid fever, because it is intolerable as the sole food in health; and because it contains much "poisonous filth," and is likely to lead to further infection and to general systemic intoxication. [That there are dangers in the use of milk is unquestionable. One of us has recently observed, in a series of typhoid cases in a large hospital-ward, an unusual amount of diarrhea, abdominal colic, and frequent and unexplainable rises of temperature during early convalescence, all of which disappeared after the milk had been regularly pasteurized. The milk-supply in this instance, when investigated, proved to be badly infected. This, however, does not alter the fact that milk is the best food that can be obtained for such cases, and does not mean that we should not use milk freely as a diet in such cases; but that a proper milk-supply should be secured—or, if this is impossible, that the milk should be pasteurized. If any care is used in securing a good milk, poisoning from bacterial products generated before the milk has been pasteurized will be extremely rare.]

¹ Lancet, Aug. 16, 1902.

² Chicago Med. Recorder, Oct., 1902.

F. C. Shattuck¹ makes some remarks upon the diet in typhoid fever. He states that W. H. Smith has analyzed the cases in the Massachusetts General Hospital that were given a somewhat **liberal diet**, and those that were kept on a purely liquid diet. Of the former, there were, in all, 563 cases; and they did not show hemorrhage, perforation, or relapse more frequently than did the others. The mortality in those freely fed was 8.8 %.

W. E. Robertson² discusses the diet in typhoid fever and recommends the use of a freer diet than is usually permitted. He gives eggs, cereals, toast, bread and butter, finely prepared vegetables, puddings, oysters fish, soups, and ripe fruit; and considers that the **results are better than those with a limited fluid diet**. He states that in about 300 autopsies he has never observed solid masses in the small bowel, no matter what diet the patient had received, unless milk had constituted the bulk of the food. In the latter case, putty-like curds have frequently been found; they have been observed in masses even as large as a hen's egg.

C. H. Lewis,³ in discussing the diagnosis and the dietetic and medicinal treatment of typhoid fever, reports a series of 90 cases that he treated by administering about half a grain of **calomel twice a day**, giving large amounts of acidulated or pure water, and keeping the diet down to about a pint of milk diluted with an equal amount of Vichy. He claims that the results were excellent, and thinks that this method is to be recommended. [Such a method of dieting is almost plain starvation, and, while having nothing to recommend it, is highly dangerous.]

B. Baskett⁴ has used **antityphoid serum as a curative agent** in 4 cases of typhoid fever. He thinks the results sufficiently encouraging to indicate the propriety of using antityphoid serum further.

F. G. Harris⁵ reports 128 cases of typhoid fever treated with **acetozone**. The mortality was only 8.59 %; while the mortality among other typhoid patients in the same hospital, treated otherwise, was 13.1 %. The author considers, also, that the patients treated with acetozone were ready to leave the hospital about 2 weeks earlier than were those treated by other methods; and he thinks that the fetor of the stools and the odor about the patients were lessened, and that the nervous and the severe abdominal symptoms were much less frequent and less marked.

G. H. Westinghouse⁶ reports the use of acetozone in 7 cases of typhoid fever. He believes that the patients convalesced rapidly, and that the stools and the other conditions of the bowels soon became normal; also, there was a marked diuretic effect, and this was associated with a **reduction of nervous symptoms**. He considers the preparation a remarkable intestinal antiseptic.

H. Valentini⁷ recommends the **systematic antifebrile treatment** of typhoid fever with **pyramidon**, giving from 3 to 6 grains 4 times a day, to adults; and smaller doses to children. He has used this treatment in

¹ Boston M. and S. Jour., Feb. 5, 1903.

² Phila. Med. Jour., Nov. 15, 1902.

³ Med. Rec., Aug. 2, 1902.

⁴ Brit. Med. Jour., Feb. 21, 1903.

⁵ Therap. Gaz., Mar. 15, 1903.

⁶ Buffalo Med. Jour., Aug., 1902.

⁷ Deut. med. Woch., April 16, 1903.

19 cases, and claims that the results have been excellent; that it is possible to reduce the temperature to normal, and keep it there throughout the whole course of the disease; and that this is associated with the absence of almost all symptoms. [The report is not accompanied with details; there is no evidence of sufficient study of the cases; and in some instances the diagnosis seems to have been highly questionable.]

C. v. Schuler¹ discusses the results of treating 450 cases of typhoid fever with **lactophenin**. He considers that this drug has a remarkable effect in quieting the nervous symptoms. The dose administered was 15 grains at 8 A. M., 3 P. M., and 8 P. M. The author thinks that the remedy also had a good effect upon the gastrointestinal tract, although in some cases no effect could be observed. He saw no unfavorable effects.

A. Kühn² discusses certain therapeutic uses of the **extract of suprarenal**—particularly in hemorrhage. He has obtained no specific effect in treating gastric hemorrhage. In typhoidal hemorrhage it worked better, but it was used in connection with the fluid extract of hydrastis canadensis. In hemoptysis it was unsatisfactory. In one case of typhoidal hemorrhage, when suprarenal tablets only were given, there developed, 2 days later, bluish-red areas on the feet; and the feet swelled and became cold. The same evening the patient developed a **typical epileptic attack**, although he had never had such attacks previously. He died later, with the appearances of edema of the lungs. The author suspects that the grave symptoms were **due to the use of the suprarenal extract** in this case, since such symptoms are so uncommon in typhoid fever. .

PARATYPHOID FEVER.

W. B. Johnston³ discusses paratyphoid fever, and **reports 4 cases**, giving an **analysis of all the previously reported cases**. The 4 cases occurred in the fall of 1901, in the medical wards of the Johns Hopkins Hospital. In two of them the paratyphoid bacillus was isolated in pure culture from the blood, and in two the diagnosis was made by the agglutination test. In the analysis of the literature of the subject, the author states that there had up to that time been **26 cases** of paratyphoid fever reported, the disease having occurred in various parts of the world and at practically all times of the year; but most of the cases have appeared in the summer and fall. The **general appearance of the cases** has been that of a typhoid fever of varying degrees of severity; but in many instances the temperature has shown marked remissions or irregularities, and crises have occurred in 3 instances. Relapses have occurred in 3 cases, and a second relapse in one case. The relapse has usually terminated by crisis. The pulse was slow and regular—sometimes dicrotic. Rose spots have been present in 18 cases. The spleen has been palpable in 15, and enlarged to percussion in 3. Epistaxis has occurred in 4 cases; vomiting in 2; and diarrhea in 10 at the beginning of the disease, and in 5 others during the later stages. The blood showed **no leukocytosis**. Albumin

¹ Berl. klin. Woch., Oct. '13, 1902. ² Therap. der Gegenwart, 1902, No. 8.

³ Am. Jour. Med. Sci., Aug., 1902.

has been found in the urine in 9 cases; casts, in 4. Many of the cases occurred during epidemics of typhoid fever. From October, 1900, to March, 1902, 194 cases of typhoid fever were admitted to the Johns Hopkins Hospital; and in all the cases in which the Widal reaction and blood-cultures were negative, the agglutination test with paratyphoid bacilli was carried out. Except in the 4 cases reported, the results were negative. The conclusion reached is that the type of the disease is identical with that produced by the typhoid bacillus, except that **diarrhea and termination by crisis are more frequent**. Myositis and purulent arthritis, rare complications in typhoid fever, have been recorded. The disease is **usually mild, but may be severe and has been fatal**. Absence of intestinal ulceration may prove to be a distinctive feature of the disease. The disease is widespread, occurring in localities in which typhoid fever is seen, but is comparatively rare.

Schottmüller¹ contributes some further observations concerning paratyphoid fever. Since his original report, he has observed 5 other cases that resembled typhoid fever clinically, but were caused by paratyphoid bacilli. The **cultural differences were especially marked on Piorkowski's medium**. The author emphasizes the fact that the condition is probably not a rare one; he has himself observed these 5 cases within a short time, and many other reports have appeared. The prognosis is certainly more favorable than is that of typhoid fever in general.

H. Kayser² reports 3 cases of paratyphoid fever. He divides paratyphoid into the A and B types. His cases reacted with the B type of the bacillus, which is the form that turns milk alkaline. His first case produced a reaction with the typhoid bacillus at 1 : 50, but reacted with the paratyphoid of type B at 1 : 100. In the other two cases the reaction was obtained at 1 : 100 to 1 : 200 with the paratyphoid of type B; while the typhoid bacillus was uninfluenced at 1 : 50. In all the cases the paratyphoid of type A was uninfluenced at 1 : 50.

J. H. Pratt³ discusses paratyphoid fever and its complications, and reports 3 previously unreported cases. The first was interesting because of the occurrence of **suppurative orchitis** following a supposed attack of typhoid fever; **Bacillus paratyphosis B was isolated from the pus**. This is the bacillus that produces a terminal alkalinity in milk. In the second case there had been an attack of supposed typhoid fever 4 years previously. The patient developed cholelithiasis, was operated upon for this, and the **paratyphoid bacillus B was recovered from the gallstones**. In the third case there was paratyphoid fever of mild course, with **saphenous phlebitis**. In this case the organism was the bacillus A. A general discussion of the condition follows; and the author particularly refers to the **frequency of complications**, 4 % of the cases so far reported having exhibited them. He also refers to a case investigated by Bain, in which there was clumping of the paratyphoid bacillus B at a dilution of 1 : 200, and no reaction with the typhoid bacillus at

¹ Zeit. f. Hyg. u. Infek., Bd. xxxvi, p. 368.

² Deut. med. Woch., April 23, 1903.

³ Boston M. and S. Jour., Feb. 5, 1903.

1 : 10. A blood-culture, however, showed the presence of the typhoid bacillus.

A. W. Hewlett¹ discusses paratyphoid fever and reports a case. The patient presented all the characteristic symptoms of typhoid fever except a palpable spleen and the Widal reaction with typhoid bacilli.

H. W. Allen² reports 3 cases of paracolon infection. In the first there was suppurative cholecystitis during convalescence; and in the pus obtained from the gall-bladder at operation the paracolon bacillus was found. The Widal reaction with the typhoid bacillus was negative. The patient's blood-serum was also tested with a paracolon bacillus with negative result. In the second case cystitis complicated the course, and paracolon bacilli were isolated from the blood and urine. There was also thrombosis of the left femoral vein. In the third case the Widal reaction was negative, but a positive reaction was obtained with the organisms isolated from the first two cases. The course of this case was that of a mild typhoid fever without complication. A blood-culture on the fourteenth day of the disease was negative, as was a culture obtained from the urine during convalescence. All the patients recovered.

W. T. Longcope³ discusses paracolon infection and reports a case with a fatal termination. At autopsy the conditions found were, in brief, a genuine paracolon infection, acute splenic tumor, parenchymatous change in the liver and kidneys, and congestion of the brain. The intestines also contained Ascaris lumbricoides. A second case, in which a relapse occurred, is reported. In both cases herpes was present, and epistaxis occurred early in the disease. In the first case a chill ushered in the attack; and there was a striking terminal hyperpyrexia, the temperature reaching 108°. The second case gave the Widal reaction with the typhoid bacillus, and it is possible that in this case there was a double infection; but the persistent presence of the paracolon bacillus, which was twice isolated from the blood, and the relatively high agglutination reaction of the serum with the paracolon bacillus make it probable that the case was chiefly a paracolon infection.

A. J. Craig and A. H. White⁴ report a case of continued fever resembling enteric fever, which was due to **Bacillus enteritidis of Gaertner**. The general course of the case, exclusive of rose-spots and splenic enlargement, was like that of typhoid fever; but the Widal reaction with the typhoid bacillus was not present in dilutions greater than 1 : 25. The patient died on the sixteenth day of the disease, and postmortem examination showed no swelling of Peyer's patches, though the intestine was congested. From the spleen, pure cultures of a bacillus that belongs to the group of *Bacillus enteritidis* were obtained. There was no definite history of food-infection in the case.

A. Jacobi⁵ reports a case of febrile disease that ended fatally. This case was, he believes, due to infection with **Bacillus coli communis**, as cultures taken from the urine gave this organism.

¹ Am. Jour. Med. Sci., Aug., 1902.

² Am. Jour. Med. Sci., Jan., 1903.

³ Am. Jour. Med. Sci., Aug., 1902.

⁴ Dublin Jour. Med. Sci., Oct. 1, 1902.

⁵ N. Y. Med. Jour., April 25, 1903.

TUBERCULOSIS.

Etiology and Pathology.—M. P. Ravenel¹ contributes a further and an important article concerning the **intercommunicability of human and bovine tuberculosis.** After reviewing the literature of the subject, he refers to his own experiments, among the most important points in which are the following: In one case, which was apparently one of definite primary intestinal infection in a child, a **culture obtained from the mesenteric glands produced tuberculosis in 2 calves and in 1 cow.** The disease had a very rapid and virulent course in these animals. The author believes that this positively demonstrates that there was in this case a human tubercle bacillus that had for cattle a pathogenic power quite as great as that of any bovine germ, or else that he had **found in the mesenteric glands of a child the actual bovine tubercle bacillus.** If Koch's law of diagnosis be accepted, the latter is the case; and this Ravenel believes to be probably the true explanation. Another culture obtained from the mesenteric glands of a child showed a virulence far in excess of that usually found in human cultures. It produced active tuberculosis in a calf. Ravenel refers to experiments conducted by himself and Pearson, which showed that large and repeated doses of a human culture of moderate virulence increase the virulence of the culture to a marked degree, while producing typical tuberculosis in the calves. He flatly insists that Koch's statement that human tuberculosis cannot be transmitted to cattle is erroneous and untenable, as has been positively demonstrated by these and other experiments.

J. Febiger and C. O. Jensen² report a series of important experiments with cases in which there was apparently a tuberculous **infection through the digestive tract.** They injected an emulsion of tubercular mesenteric glands into calves. In the first of these cases, that of an adult, the result was almost negative, the bacilli showing but little virulence. In the second, that of a child 11 years old, there was a positive result, with the production of fresh pearl disease. In the 3 other cases—one in a boy of 6 years, one in a girl of 19 months, and one in a boy of 4 months—the result was positive, the injections producing tuberculosis in the calves. In the last 3 cases of children it was evident that the bacilli were virulent—and in part extremely virulent—for calves. This made it seem probable that the infection had actually been due to the bovine bacillus. In the older cases the bacilli were less virulent, and the authors believe that it is not at all improbable that the **virulence of tubercle bacilli for cattle becomes less** according to the length of time that they have grown in the human body.

M. Wolff³ injected guineapigs with an emulsion of the spleen of a case that had died of primary intestinal tuberculosis. The thorax was free of tuberculosis, while there was intestinal tuberculosis, with tubercles on the peritoneum and in the spleen. The guineapigs developed tuberculosis; and an **emulsion made from their tuberculous glands was in-**

¹ Medicine, July, 1902.

² Berl. klin. Woch., Sept. 22, 1902.

³ Deut. med. Woch., Aug. 7, 1902

jected into a calf 5 months old. Previous injections of tuberculin in the latter animal had been negative, but after the injection it repeatedly reacted to tuberculin. It was killed on the eighty-third day after the injection, at which time it presented severe localized tuberculosis and the characteristic appearances of pearl disease. The author has also injected a calf with the sputum of tuberculous subjects, and produced tuberculosis at the point of injection and in the neighboring glands; while the organs in general were free from involvement.

A. Heller,¹ in discussing tuberculous **infection through the digestive tract**, refers especially to the differences between the statistics of Baginsky and those obtained in Kiel and in Boston. These statistics refer to diphtheria and tuberculosis. Under the latter heading tuberculosis arising through the digestive tract is discussed. The percentage of such cases in Kiel was 37.8; in Boston, 37.1. In Baginsky's series, this percentage was only 4.1. The author believes that the individual factor in collecting these statistics controls the conclusions reached. It is also probable that the method of carrying out the necropsy has something to do with it. He thinks that primary infection undoubtedly takes place with considerable frequency through the digestive tract, and states that he has **recently observed a number of such cases**, mentioning one in a boy of 13 who came to necropsy with a diagnosis of intestinal tuberculosis. An enormous tuberculous ulcer of the small intestine, a large tuberculous ulcer of the cecum, and swelling and caseation of the mesenteric glands were found. There were miliary tubercles of the liver, marked amyloid change in the spleen, and slight amyloid degeneration of the kidneys and suprarenals; otherwise, no tuberculosis. It was considered that this child must have acquired his tuberculosis through food; and, since it had become extensive in a short time, it was probable that he had received large amounts of infective material. The source of it could not be determined, but it was believed that there was considerable tuberculosis among the cattle in the neighborhood.

D. v. Hansemann² discusses **food-tuberculosis, and reports 25 cases** that he has observed in 7 years. In these, he believes tuberculosis could be considered with fair definiteness to have originated through infection from the gastrointestinal tract. In 5 of them the disease was localized in the intestinal mucosa; in 12 others, in the intestine and the neighboring mesenteric glands. In 4 other cases it had spread throughout the abdomen; and in the remaining cases the abdominal lesions were so much older than those elsewhere that the primary seat seemed to be quite evident. The author states that it is certain that **infection through the gastrointestinal tract may occur** and that it does occur in a certain number of cases; and he insists upon the fact that persons differ in their predisposition to the disease. As a rule, the resistance to tuberculous infection through the gastrointestinal tract is very marked, particularly in adults. Therefore, such infection occurs comparatively seldom. It must, however, be recognized that the possibility of tuberculous infection through the gastrointestinal tract exists, particularly

¹ Deut. med. Woch., Sept. 25, 1902.

² Berl. klin. Woch., Feb. 16-23, 1903.

in children, invalids, and the aged. It is a noteworthy fact that 5 of the cases reported by Hansemann occurred in persons beyond the age of 70 years.

D. E. Salmon,¹ in a discussion of the **relation between human and bovine tuberculosis**, refers to the Massachusetts statistics indicating an **increase in other forms of tuberculosis than phthisis** in children under 5 years of age, with a coincident reduction in the mortality from phthisis at all ages. He also refers to the statistics of Michigan, which indicate a remarkable relative increase in the number of cases of tuberculosis other than the pulmonary form. He likewise gives statistics of tabes mesenterica, which show a remarkable preponderance of this disease in Great Britain and Ireland. The latter is, he believes, due to the fact that **in those countries milk is less frequently sterilized** than elsewhere. The former statistics he attributes to infection of milk and other foods.

R. Koch² gives a general review of the publications that have appeared since his celebrated article at the London Congress, confining himself, however, to the question of the **communicability of bovine tuberculosis to human beings**, and stating that a discussion of the contrary proposition would carry him too far in this paper. He says that, in spite of a request from the authorities to do so, no one has, in the last 15 months, brought to his attention any case of primary intestinal tuberculosis in which the disease was thought to be due to drinking milk from tuberculous cattle. He states that he has examined the case that M. Wolff mentioned. Wolff said that he had produced tuberculosis in animals with a culture from this case, which was apparently one of primary intestinal tuberculosis. Koch's results were directly contrary to Wolff's. The explanation for this, Koch postpones to a future paper. **The cases of infection of the skin he dismisses as being unproved.** Pfeiffer's case of apparent skin-infection from a wound, the author believes to have been purely a coincidence and to have been of human origin. He insists that if milk causes infection, the infection should appear in groups of cases; but this does not occur. He also insists that there is **no authenticated case of tuberculous infection from eating uncooked tuberculous meat.** He closes with the statement that, in order to prove human infection from animals, the cases must be examined at autopsy; other sources of infection must be excluded; and there must be a careful observation of other persons that have had the same opportunity for infection. From this standpoint, Koch considers that the possibility of tuberculous infection from animals has not been proved.

Köhler³ discusses the present status of the question of the communicability of animal tuberculosis to man. While he admits the possibility of its being so communicated, he considers that the relation of tuberculosis in animals to that in man is far from being definitely determined. He believes that the most important point by far is to prevent the transmission of tuberculosis from different human beings to each other; and

¹ Jour. Am. Med. Assoc., Dec. 20, 1902. ² Deut. med. Woch., Nov. 27, 1902.

³ Deut. med. Woch., Nov. 6, 1902.

that hygienic regulations with this point in view are much more important than those that refer to animal tuberculosis.

A. Moeller¹ reports some experiments concerning the **infection of calves and goats with human tubercle bacilli**. He fed such bacilli to calves; inoculated the calves with them, subcutaneously, intraperitoneally, and intravenously; and let the animals inhale them in a spray. In no case, however, did he succeed in producing tuberculosis. Two goats were fed with tuberculous sputum, without result; and one was given an intraperitoneal injection, with the production of local tubercles of the peritoneum. There was no general invasion in this animal. The tubercles were rubbed into an emulsion and injected into a calf, without result. The author decides that his results show that **calves cannot be infected with human tubercle bacilli** when used after the methods mentioned, nor after human bacilli have been passed through the goat. He also considers that it is impossible to produce an advancing, progressive tuberculosis in the goat with human bacilli [a conclusion which is by no means justified, since Ravenel and Pearson, in Philadelphia, and a number of men elsewhere, have shown entirely conclusively that cattle and various other animals may be infected with human tuberculosis].

P. Krause² reports the case of a young man who worked in a slaughterhouse. He injured his thumb and afterward had glandular swellings on the arm. Extirpation of these glands showed that they were tuberculous. Tuberculosis did not develop in other organs. The case is considered to be **definite evidence that animal tuberculosis may be transferred to man**.

O. Lassar³ states that in looking over his statistics of 108,000 patients, he has found **34 instances of inoculation tuberculosis of the skin**. Only 4 of the subjects were butchers. He has, however, undertaken a deliberate investigation of a series of 365 persons directly connected with the slaughtering of animals. Among these, he found 7 cases of undoubted inoculation tuberculosis and 3 suspicious cases; the percentage, then, was either 1.92 or 3—a high percentage, certainly, as compared with the rest of humanity. The author refers to the other work on this question, particularly to that of Ravenel, and indicates his conviction that this is an important matter.

S. Ito⁴ has made a study of 104 cases with reference to **tuberculosis of the tonsils** and of the lymphoid tissue of the pharynx, the base of the tongue, and the epiglottis. He found no evidence of primary tuberculosis in any of these situations. In 5 cases he found secondary tuberculosis of the tonsils; in 2 cases, of the pharyngeal tonsil; in one case, of the epiglottis; and in one, of the mucous glands of the tongue.

Tarchetti and Zanconi⁵ discuss the **relation of enlargements of the tonsils and of adenoids to tuberculosis**. In 14 cases from which they obtained material, they were unable to find any evidence of tuberculosis. They, however, agree that the question needs further study.

¹ Deut. med. Woch., Oct. 2, 1902.

² Münch. med. Woch., 1902, No. 25.

³ Deut. med. Woch., Oct. 2, 1902.

⁴ Berl. klin. Woch., Jan. 12, 1903.

⁵ Gaz. degli Osped., 1902, No. 102.

S. Kaminer and H. Zade¹ have studied the **relation between tuberculosis and lateral curvature** of the spine. In 3700 women they found lateral curvature 179 times; in 500 children, 26 times. All these persons were patients at the polyclinic for diseases of the lungs. The children showed a combination of pulmonary disease with scoliosis in 23 % of cases, while this combination was observed in the adults in 76.5 %. The more marked the scoliosis, the more frequently were both apices affected. The authors could not positively confirm the statement of Mosse that with a dorsal scoliosis the apex on the convex side of the curve is usually affected.

E. Aronsohn² reports 23 cases in which persons with tuberculosis showed a more or less marked family history of carcinoma. He believes that **carcinoma in the parents predisposes to tuberculosis in the children**, and probably also to other infectious diseases. He intimates that this is probably accomplished through reducing the resistance of the children. This seems to be especially active in connection with tuberculosis, however, as a number of authors have made reports showing as high as 10 % of a family history of carcinoma in the parents of persons with tuberculosis.

B. S. Cowen³ believes that he has demonstrated that the tuberculosis in the district in which he lives is due, not to poverty and crowding, but **chiefly to the occupation** in which most of the men are engaged; viz., mining. He notes that there are 6 times as many deaths from tuberculosis as from fatal mining-accidents in that region. The deaths from tuberculosis after the age of 45 years were 13 in men to 1 in women.

R. S. Trotter,⁴ in discussing **anthracosis and phthisis in coal-miners**, insists upon his belief that coal-dust and soot have a **protective effect against phthisis**. He states that this disease is comparatively rare among coal-miners; and that when it occurs in coal-mining districts, it is more common among women than among men. When phthisis occurs among such persons, he believes, there is usually a strong family history of tuberculosis. He also refers to the fact that coal-dust, when introduced under the skin, produces no evidence of irritation.

J. J. Curry⁵ contributes a series of figures from the records among natives and among soldiers in the United States army, to demonstrate that the usual view that tuberculosis is much more common in cold and temperate climates than in the tropics is erroneous. He believes that **tuberculosis causes more deaths in the tropics** than yellow fever and malaria together, and that it is extremely common.

J. Mitulescu⁶ discusses chronic tuberculosis from the standpoint of cell-metabolism, in a somewhat theoretic style. He reports several **investigations of metabolism**. He shows that, as the disease advances, the organism loses the power of compensating for the intoxication or controlling it; and that, as a result, there is an **increasing tendency to a**

¹ Deut. Aerzte-Zeitung, 1902, Heft 20.

² Deut. med. Woch., Nov. 20, 1902.

³ Intercoll. Med. Jour. of Australasia, Sept. 20, 1902.

⁴ Brit. Med. Jour., May 23, 1903.

⁵ Jour. Assoc. of Military Surgeons, Feb., 1903.

⁶ Zent. f. innere Med., Oct. 25, 1902.

loss of nitrogen and phosphorus; while, if the tissues are at first being broken down and the patient improves under treatment, it will be seen that a retention occurs.

J. Mitulescu¹ also contributes a series of studies of **metabolism in tuberculosis.** He finds that in many early cases of tuberculosis there is an **increase in metabolic function.** In some cases this leads to loss of tissue, but in others it is compensated for. Fever increases the loss, and this excess of metabolism results in anemia and emaciation. In cases with hemoptysis the excretion of nitrogen and phosphorus in the urine is decreased, probably because these substances are lost in large amounts through the hemorrhages. When the hemorrhage ceases, the nitrogen and phosphorus of the urine reach their previous amounts. When the infection is checked, the organism recovers its previous losses. In the advanced cases absorption is poor; there is subnutrition; the vitality is low; and the power of recovering losses has itself been lost.

Symptomatology.—Meisenburg² discusses the **relation between pulmonary phthisis and valvular heart disease.** His statistics concern the records of 4649 subjects of phthisis. In all the patients observed during this time he found 1.75 % of valvular heart-disease. In the phthisical subjects he found 1.14 %. In 406 persons that had double mitral disease he found 9.3 % with concomitant tuberculosis. Tuberculosis was more frequent in those with mitral insufficiency than in those with mitral stenosis. Tuberculosis was less common in aortic disease than in mitral insufficiency. Of 5 subjects that had stenosis of the pulmonary artery, 4 exhibited tuberculosis. The author thinks that the influence of valvular heart lesions upon the development and the course of pulmonary tuberculosis is **much less important than it is commonly said to be.** The relative immunity in cases of mitral stenosis he considers to be due to the elevation of venous pressure and to other factors, among which are the stasis of blood in the tissues and the increase in the alkalinity of the blood.

M. L. Stevens³ discusses the **condition of the blood** in 100 cases of pulmonary tuberculosis, making a study of the hemoglobin, the red and the white cells, and the specific gravity of the blood. The number of red cells is likely to be higher than the appearances would indicate. A **low count suggests low resisting power** or unfavorable complications. Anemia seems to be a characteristic feature of pulmonary tuberculosis. The specific gravity is low, but is somewhat higher than would correspond with the hemoglobin. The number of leukocytes varies from half the normal to four times the normal number, depending upon the stage of the disease, the character of the infection, the resisting power of the individual, and the presence of complications.

S. Loving⁴ reports a case of **subcutaneous emphysema** from perforation of the pleura, through the extension of tubercular ulceration from the lung. The case occurred in a mulatto of 33 years. The subcutaneous swelling soon reached from the clavicle down to the crest of the

¹ Berl. klin. Woch., Nov. 3-24, 1902.

² Med. Rec., July 26, 1902.

³ Zeit. f. Tuberk. u. Heilst., Sept., 1902.

⁴ Phila. Med. Jour., April 4, 1903.

ilium on the right side, and afterward extended somewhat further. Some punctures of the skin were made, but did not reduce the swelling. The condition ultimately extended as far up as the face and down the arm. It then disappeared spontaneously at about the time of the patient's death. The cause was found postmortem to have been rupture of a cavity into the subcutaneous tissue.

A. Moeller,¹ in connection with the case described by Pel, reports one of early pulmonary phthisis in which there was a very **striking, musical lung-murmur**, synchronous with the heart-beat, the murmur being heard best above the spine of the scapula on the right side. An increase in the strength of the heart-action increased the intensity of the murmur, but in ordinary circumstances the murmur could be heard at some distance from the chest. The patient herself had noticed it. With improvements in the pulmonary condition, the murmur decreased in intensity and changed its character. The author believes that it had been **produced by the disease of the lungs**, probably through compressing a vein and an artery, the vein being thrown into vibrations by the systolic distention of the artery.

Erben² reports a case of **productive tuberculous pleurisy** that occurred in a woman of 24. The patient had tuberculosis of the left apex and had acquired a pyopneumothorax of the left side. As the result of the latter, the pleura became infected with tubercle bacilli. Tuberculoma also developed in the canal of the puncture produced by aspiration.

R. H. Babcock³ reports a series of cases of **pleurisy with more or less permanent pneumonic induration**. The chief characteristics of the cases were that the patients did not seem very ill and had but little fever or other active symptoms. All but one have recovered, and now seem to be in good health. In all these cases the extent and degree of dulness were such as to suggest considerable effusion, but only a small amount of fluid was found; therefore, apparently some actual induration of the lung must have been present, to explain the degree of dulness and the condition of the respiratory sounds. One patient has since died of tuberculosis, and in two others there was a marked tuberculous family history. Examination of the sputum, when obtained, showed an absence of tubercle bacilli. Babcock believes that the cases were tuberculous, and that the pleurisy was also probably tuberculous.

O. Borchgrevink⁴ describes a case of anatomically demonstrated **spontaneous cure of tuberculous peritonitis** in a girl 16 years of age. She was admitted with marked ascites of indefinite character. Eleven liters of fluid were drawn off, but the fluid rapidly reaccumulated. The patient had no signs of tuberculosis, and it was suspected that the condition might be cirrhosis of the liver. Two guineapigs were, however, injected with the fluid, and both died of tuberculosis. The patient improved rapidly after a few months, and apparently became entirely well; but she died suddenly with severe heart symptoms. There was a previous history of pericarditis. Postmortem examination showed an old pericarditis,

¹ Berl. klin. Woch., May 25, 1903.

³ Chicago Med. Recorder, Sept., 1902.

² Wien. klin. Woch., 1902, No. 42.

⁴ Deut. med. Woch., Jan. 15, 1903.

evidently tuberculous, the infection having come from a neighboring bronchial gland. There was an old tuberculous peritonitis, in which no tubercles were recognized, either macroscopically or microscopically. The infection had apparently come from the pericardium.

A. Ponceet¹ discusses what he terms **abarticulare tuberculosum rheumatism**, or visceral and other localizations of "tubercular rheumatism." He especially insists upon the fact that the general conception of tuberculosis as a process that produces fungous growths, caseation, and typical microscopic appearances, is erroneous. He refers to his view concerning joint-symptoms, both acute and chronic, due, he thinks, to tuberculosis, but not exhibiting the ordinary characteristics of tuberculous joint disease; and describes a number of curious observations concerning the localization of tuberculosis elsewhere than in the joints in unusual forms. He first mentions a joint case that developed in the form of a dry, painful osteoarthritis of the knee. Excision was finally carried out. There was neither fungosity nor suppuration; and the articular extremities of the bone were much enlarged, the synovial membrane not showing great change. There was marked osteoporosis of the epiphyses of the femur and tibia. The marrow was injected into guineapigs, and produced tuberculosis. The author also mentions a case of advanced pulmonary tuberculosis, with fungous osteoarthritis of the ankle, and with chronic dry polyarthritis. Postmortem examination showed, besides tuberculosis elsewhere, lesions of the aortic and mitral valves with papillomatous vegetations. No miliary tubercles were seen, but the injection of **fragments of the heart-valves into guineapigs produced tuberculosis**. A number of other cases are mentioned, in which Ponceet believes that similar conditions were produced by tuberculosis; though little proof is presented of this contention. He insists that tuberculous meningitis may, and does at times, end fatally.

J. M. Anders² reports a case of **tuberculosis of the myocardium** in which death occurred very unexpectedly. The autopsy showed a single large caseous tubercle in the right auricle. There was also pericarditis, and the myocardial involvement was evidently the result of extension by contiguity. There were likewise pleurisy and localized tuberculosis of the lung. In reviewing the literature, the author comes to the conclusion that there has, as yet, been no demonstration of the existence of a primary form of tuberculosis of the myocardium. When tuberculosis of the myocardium exists, it most commonly involves the ventricle. It may be of the variety of large tubercles; there may be miliary masses; there may be a diffuse tubercular infiltration; and there may be a diffuse sclerosis—a true tuberculous myocarditis. **Ulceration rarely occurs.** It is probable that the infection is most often from some other source in the thorax, and that the heart becomes involved through the lymphatic system, very often with the intervention of the pericardium. The symptoms are due chiefly to the pressure of the growths and to myocardial degeneration. The **diagnosis may be suggested** by attacks of sudden

¹ Bull. de l'Acad. de Méd., July 15, 1902.

² Jour. Am. Med. Assoc., Nov. 1, 1902.

severe collapse in a subject of general tuberculosis, these attacks passing away quickly and being accompanied with weak endocardial murmurs. Tuberculosis of the myocardium is, Anders thinks, more frequent than is generally supposed.

A. Abrams¹ discusses the condition that he calls bronchial phthisis, by which he means **tuberculous lymphadenitis of the tracheobronchial glands**. He states that he has seen 25 such cases within 4 years. He makes the diagnosis by means of spasmodic cough, tubercle bacilli in the sputum, dyspnea out of proportion with the physical signs, dulness anteriorly and posteriorly at a point corresponding with the bifurcation of the trachea, comparatively good health in spite of prolonged symptoms, absence of the physical signs of disease of the lungs themselves, and the evidences of enlarged bronchial glands found upon *x-ray* examination.

G. W. McCaskey² reports a case that was first considered to be myocardial atony with gastrointestinal derangement, in which diffuse pain in the upper part of the chest was a striking symptom. Tuberculin was injected; and after the use of 20 mg., a reaction occurred. Tuberculin treatment in small doses was then instituted, together with other measures. Improvement occurred, and the condition was then thought to be **tuberculosis of the bronchial glands**.

E. Hirschmann and O. Stross³ report a case of **general tuberculosis of the lymphatic apparatus** in a man of 28 years, the swelling of the glands having been the first sign of the disease. One gland in the neck broke down and required incision. The general condition grew worse, the patient became anemic, the liver and spleen enlarged, and the man became hectic and died about 15 months after the beginning of the disease. The patient had had some cough, but no tubercle bacilli were found in the sputum. He had a polymorphonuclear leukocytosis, which increased up to 42,000. The clinical diagnosis was tuberculosis running under the picture of pseudoleukemia, the blood-condition constituting the chief reason for this diagnosis, which was also supported by the hectic continuous fever with night-sweats and the spontaneous suppuration of some of the glands. The necropsy confirmed this diagnosis. Some of the glands showed caseation and some did not. Tubercle bacilli were found in large numbers in some of the glands. The authors do not consider that it is, as yet, settled that Sternberg was right in his statement that most of the cases of so-called Hodgkin's disease are cases of tuberculosis.

Schur⁴ reports the case of a woman of 26 years who died with **general glandular enlargement** and fever, under the clinical picture of glandular tuberculosis simulating pseudoleukemia. Postmortem examination showed chronic tubercular disease of the liver, kidney, and spleen. The author believes that it is frequently **possible to distinguish this condition** clinically from Hodgkin's disease, by carefully observing the minor symptoms, and by frequently examining the blood. The differences, however, are chiefly quantitative, rather than qualitative.

¹ N. Y. Med. Jour., Jan. 3, 1903.

³ Deut. med. Woch., May 21, 1903.

² Amer. Med., Feb. 14, 1902.

⁴ Wien. klin. Woch., 1903, No. 5.

J. Spijarny¹ reports a case of what he considers to have been **malignant lymphoma combined with tuberculosis**, which occurred in a man 25 years old. The patient had a family history of tuberculosis, and his general constitution was phthisical. He also had pleurisy without explainable cause, and at his death was found to have had miliary tuberculosis. He likewise had general enlargement of the glands; and one of these, when extirpated, showed the appearance characteristic of malignant lymphoma. The author believes it demonstrated that malignant lymphoma and tuberculosis may occur in the same case; although there are cases of pure tuberculosis that, in their clinical course, closely resemble malignant lymphoma.

R. J. Pouchtchivoi² has made a study of a **series of cases of glandular enlargement** in about 40 soldiers. In 24 instances these were macroscopically tuberculous; and in 14 others they were shown microscopically to be so.

Diagnosis.—Sticker³ discusses the **diagnosis of the predisposition to tuberculosis**. He finds that the power of the inspiratory muscles, as measured by the thoracodynamometer, is far lower, as compared with their power of manual traction, in phthisical subjects than in normal subjects. He believes that this **reduction in the inspiratory power is an important sign** of predisposition to phthisis.

A. Wolff⁴ discusses **percussion of the lungs by Krönig's method**, and recommends it as being of value in the early diagnosis of phthisis. Because of the difficulty in determining the limits of the apex accurately in all directions, Wolff and Michaelis have adopted the method of determining the breadth of what they call the isthmus of the apex; viz., a point 1 cm. below the sternomastoid and 3 cm. above the clavicle. This is the narrowest point, and should be at least 4 cm. in width. Careful percussion of the apex will show both retraction and infiltration, when present, but retraction is much easier to demonstrate than is infiltration.

A. G. Auld⁵ describes his **method of examining the apices** of the lungs, which is practically a slight modification of the Krönig method, though Auld maps out various segments. He insists upon the importance of determining that there is a distinct difference between the apices on the two sides.

R. W. Philip⁶ refers to the importance of **careful and systematic percussion** in the diagnosis of early tubercular changes in the lungs. He particularly insists upon the importance of percussing the portion of the apex above the clavicle, and of determining its extent as compared with that of the other side. He thinks that it is important to percuss in a plane at right angles with the vertical diameter of the lung. He also considers what he calls tidal percussion to be of much value. This is the determination of the extent of the apex at the time of expiration and of full inspiration. The change will often be found limited in early tuberculosis.

¹ Deut. med. Woch., Nov. 20, 1902.

² Münch. med. Woch., Aug. 19, 1902.

³ Lancet, Feb. 14, 1903.

⁴ Rev. de la Tuberc., April, 1903.

⁵ Deut. med. Woch., Feb. 5, 1903.

⁶ Practitioner, Jan., 1903.

E. H. Colbeck,¹ replying to Philip's article, refers at length to his own investigations, in part previously published, which he believes to indicate that the **tidal percussion-phenomena** elicited over the apexes in early tuberculosis are exactly the contrary of what is usually taught; since he finds that the pitch of the percussion-note over the clavicle rises from below upward during full inspiration, and falls from above downward during expiration. In other words, there is a decrease in the limit of pulmonary resonance above and in the supraclavicular fossa during full inspiration, and an increase during expiration. He says that his recent observations have confirmed these results, and advances physiologic and anatomic reasons for the necessity of such conditions, reporting clinical observations to demonstrate their truth.

O. Henssen² discusses **cog-wheel breathing**. He found it present in 14.5 % of 268 phthisical subjects. It is most commonly heard in the subclavicular fossa; more rarely, in the lower part of the left side posteriorly. Twenty-six of the 39 phthisical subjects were in advanced stages. It was observed 4 times in 88 apparently healthy men, although there was some suspicion of tuberculosis in 2 of these, and the others had had pleurisy. Cog-wheel breathing is **directly dependent upon the heart-action**. The symptom is thought by the author to originate in hyperemia of the lung-tissue. The hard, systolic swelling of the lung-capillaries produces some interference with the entrance of air, and results in an audible murmur.

J. N. Hall³ reports 2 cases of pulmonary tuberculosis in which marked dyspnea, associated with some other signs, led him to believe that there was **bronchial obstruction due to enlarged glands**. He also describes a case in which a diagnosis of pulmonary tuberculosis had been made and in which he suspected that the diagnosis had been due to the presence of creaking in the shoulder-joint, the creaking being transmitted some distance beyond the joint and closely resembling pleuritic friction. The sound occurred during respiration when the arms were folded. Another case is noted, in which a similar sign was found.

J. D. Madison⁴ contributes an interesting discussion of **tuberculin as a means of diagnosis**, referring extensively to the literature of the subject and citing his own extended work. The latter consisted in investigating a series of consecutive cases numbering 400, and in making isolated observations in 125 others. He particularly refers to the fact that a series of cases in which necropsy showed that there had been no active tuberculosis present had reacted to tuberculin only a short time previously. These bodies presented scars of old tuberculosis, however, and the author believes it probable that **healed tuberculosis may produce a reaction**. The reaction did not, however, occur in a number of cases in which autopsy showed the presence of healed tuberculosis. Madison also describes one case in which the reaction occurred, but in which autopsy showed no evidence of tuberculosis; and he notes that cases of actual tuberculosis may not react to the maximum dose at times when they

¹ Practitioner, Mar., 1903.
² Med. Rec., July 26, 1902.

³ Deut. Arch. f. klin. Med., Bd. lxxiv, 1902.
⁴ Amer. Med., Dec. 20, 1902.

are already febrile. He believes that there has, as yet, been no conclusive evidence presented that other diseases than tuberculosis may cause the reaction; still, the **margin of error** in the use of tuberculin is, he thinks, **probably not less than 10 %**. The maximum dose should be between 4 and 10 mg. He thinks that an initial dose of 3 to 5 mg., followed by the maximum dose, is the best method of procedure. If the temperature is distinctly above normal at the time of the reaction, a negative result is of no consequence. He has made the important observation that the glycerin extract of tuberculin tends to deteriorate, and that this deterioration apparently often causes a delayed reaction. He insists upon the **importance of using fresh tuberculin**, and of keeping it in a cool, dark place. He admits that tuberculin injections may not be wholly without ill effects, but thinks that the use of tuberculin is of enough advantage to offset any possible dangers incurred, if its employment is restricted to suitable cases. He has found that **about 40 % of all female patients** admitted to the Danvers Insane Hospital **reacted to tuberculin**.

J. A. Grober¹ discusses **animal injection as a method of determining the tuberculous nature of pleural exudates**. He particularly insists upon the importance of having a **correct method** of carrying out these animal injections. In the first place, one should be careful to use only **animals that are quite free of tuberculosis**, and that are kept in surroundings that render it impossible for them to acquire tuberculosis from their cages or their food. They must be completely isolated during the experiment. The **quantity injected should be as large as possible**—as much as 10 cc. to 20 cc. for each animal. If possible, a **number of guineapigs should be injected from each case**. The latter point is one of importance. The author considers that the guineapig is always susceptible to the intraperitoneal injection of tubercle bacilli contained in fluids. To demonstrate this, he reports 11 cases in which the fluid injected (which was in 9 cases pleural exudate) was certainly tuberculous; 24 animals were injected from these cases, and all died of tuberculosis. He then reports 13 other cases that were nontuberculous, 28 animals having been injected with the fluids from these cases, and none of them having died of tuberculosis. He then describes 12 cases of pleural effusion that were said to be nontuberculous. In all instances but one the animal injection was negative. In this case the 3 animals injected all developed tuberculosis. In 25 further cases, in which there was a suspicion of tuberculosis, fluid was injected into 41 animals; 16 of these (injected from 12 cases) died of tuberculosis. It is worthy of note that in several of the cases when a number of animals were injected, all did not die of tuberculosis. This indicates the importance of using more than one animal. In conclusion, Grober states that this method is an extremely important one, and is a nearly absolutely correct way of determining the tuberculous nature of a pleurisy when effusion is present, provided the regulations mentioned can be followed. It must be remembered, however, that there are many cases of dry pleurisy that are tuberculous, and that in

¹ Deut. Arch. f. klin. Med., Bd. lxxiv, Heft 1 u. 2.

these, clinical observation is the only method of determining the nature of the condition.

Ilvento¹ has carried out a study of the **agglutination of the tubercle bacillus**. He considers that if agglutination at 1:100 occurs with blood-serum, and agglutination at 1:5 with a serous exudate, this permits of a diagnosis of tuberculosis. Serous exudates from nontuberculous persons practically do not agglutinate the bacillus at all. The agglutinative action of the blood-serum of tuberculous subjects tends to increase. When this occurs, it is of diagnostic importance, but has no prognostic value. With normal persons, the author found agglutination in dilutions as high as 1:50. With the blood-serum of the ass, agglutination occurred at 1:200; with that of the dog, at 1:20 up to 1:50; while with rabbits and guineapigs, it occurred at only 1:10. This Ilvento considers to indicate that resistant persons have substances in their normal serum that produce agglutination of the tubercle bacillus in more or less marked dilution.

P. Ruitinga² has studied the serum-diagnosis of tuberculosis. He found that in 20 persons that were certainly not tuberculous, 11 positive reactions were obtained; while the reaction was often absent in tuberculous persons. He **considers the reaction valueless.**

E. Lichtenstein³ reports a case in which **acid-fast bacilli** that were **apparently not tubercle bacilli** were found in the sputum. The patient was a man of 50 who had had cough and expectoration for 5 years. The cough had repeatedly disappeared, however, for as long as 6 months. It was associated with hemoptysis in the early stages of the periods of cough. The acid-fast quality of the bacilli in the sputum was evidenced only in watery solutions. In acid alcohol they were rapidly decolorized. Animal injections and cultures demonstrated that they were not tubercle bacilli. Lung-tissue was absent. The author considers that the recent literature demonstrates that **one cannot say offhand, from an examination of the sputum, that tuberculosis is present.** He especially recommends that one should not use Gabbet's solution, but should stain, decolorize, and counterstain separately, and that the decolorizing should be done with acid alcohol.

Milchner⁴ showed to the Berlin Medical Society specimens from a case that had previously been reported on account of **infection with pseudotubercle bacilli**. There were repeated hemoptysis, infiltration of the lower part of the left lung, and many acid-fast bacilli in the sputum; and these bacilli were shown through animal-inoculation to be pseudotubercle bacilli. The sputum became fetid and the general condition worse, and the case ended fatally, necropsy showing a bronchiectatic cavity in the left lower lobe containing many pseudotubercle bacilli. The bacilli were not found in other parts of the lung. Von Leyden, who had seen the case, had at first made a diagnosis of fibrinous bronchitis; but when acid-fast bacilli were found, had thought it to be one of true tuberculosis,

¹ Rif. med., 1902, Nos. 261 and 262.

² Zeit. f. Tuberk. u. Heilst., 1902, iii, p. 489.

³ Zeit. f. Tuberk. u. Heilst., Bd. iii, p. 193.

⁴ Zent. f. inn. Med., 1903, p. 410.

until the organisms were shown to be pseudotubercle bacilli. He **doubted whether these bacilli had any causal relation** to the disease. A. Fraenkel had observed pseudotubercle bacilli recently in a case of gangrene of the lung. Necropsy showed a combination of tuberculosis and gangrene. Animal experiments were negative. Benda considered this case, however, to have been one of true tuberculosis.

E. Marguliez¹ refers to the fact that there have been no careful determinations as to the **frequency of choroidal tubercles** in acute miliary tuberculosis. He discusses particularly the form of these tubercles and the direction in which they grow. He says that it is always stated that they exhibit a prominence toward the retina. He, however, reports a case in which this was not true, the tubercles being found clinically and at autopsy to have developed only toward the sclera. Their characteristic of growing toward the retina is, therefore, not an essential one.

Prognosis.—E. Stadler,² in a study of the **influence of pulmonary tuberculosis upon the duration of life** and upon the capability of working, and of the value of institutional treatment of tuberculosis, states that the usual duration of the disease in the working classes is 6 or 7 years, and somewhat longer in women. Occupation does not seem to have much influence. The duration of the capability of working is in direct proportion to the duration of the disease. After 5 years, about half the subjects are able to work. A short treatment of the disease in sanatoriums makes about one-fifth of the subjects live for about 3 years longer than they otherwise would. This, the author believes, is about the extent of the value of such treatment. [A conclusion that, in the form in which it is given, is unwise and erroneous.]

L. Brown³ discusses the **weight of persons with pulmonary tuberculosis**, having made a study of 1200 weight-charts. He reaches the conclusion that loss of weight is probably due to toxin-absorption. Carefully **regulated rest and exercise are of great importance** as regards the body-weight in pulmonary tuberculosis. **Forced muscular exercise is always injurious.** The weight often increases after a mere change of residence or climate. An excessive gain in weight may be injurious. The gain in weight is at first most marked in the chest; afterward in the abdomen in men, and in the hips in women. A rapid and continuous loss in weight is one of the surest indications that a patient is quickly losing ground. A gain of a few pounds is of little value in prognosis; but if the patient constantly gains over a period of two months, this usually indicates improvement. On the whole, the patients that gain over 20 pounds do better than those that gain less. Cold weather seems to stimulate assimilation and gain in weight more than does warm weather.

F. Reiche⁴ discusses **hemoptysis as an initial symptom** of tuberculosis of the lungs. Some clinicians have directed attention to the fact that when hemoptysis occurs very early, the patients put themselves under treatment almost at once; hence, prognosis in these cases is likely

¹ Zeit. f. klin. Med., Bd. xlviii, Hefte 3 u. 4.

² Deut. Arch. f. klin. Med., Bd. lxxv, Hefte 3-5

³ Amer. Med., April 25, 1903.

⁴ Zeit. f. Tuber. u. Heilst., Bd. iii, p. 222.

to be better than in the general average. Reiche has studied this question statistically, and in nearly 2000 cases that he has observed he has found that 9.2 % had initial hemoptysis. When the figures were studied in those patients that were still able to work a year after sanatorium treatment, he found that those with initial hemoptysis constituted 17.9 % of the total. Hence, these cases evidently showed a better prognosis than the general mass of cases. Hemoptysis is, therefore, an indication to these patients of the necessity for immediate treatment. If the hemorrhage is frequently repeated, it has, of course, an unfavorable effect.

L. Brown¹ has made a study of the **prognostic value of the general characteristics of tuberculous sputum**, and that of the number of tubercle bacilli in the sputum. The general character of the sputum is no index of the presence or absence of tubercle bacilli. If the number of bacilli steadily decreases at a series of examinations, the patient is probably improving; but the general symptoms and local signs are much more accurate guides. If large numbers of tubercle bacilli are repeatedly found, the patient has probably reached the stage of cavity-formation. As a rule, the presence of large numbers of short bacilli is suggestive of active progress in the disease, and the discovery of clumps of bacilli is likely to indicate a severe course.

Geiseler² has made a study of 100 persons with tuberculosis, observing them, on the average, for 4 months, **in relation to the diazo reaction**. He used paramidoacetophenon, 0.25 part; HCl, 25.0 parts; distilled water, q. s. ad 500 parts. Four cubic centimeters of this is taken, 1 or 2 drops of a 0.5 % solution of sodium nitrite is added, and also 4 cc. of urine. This is shaken, and 1 cc. of ammonia is added. In all cases of acute caseous pneumonia, the reaction was found. Except for these cases, it was found in only 6 % of the others that were chronic; and all these 6 cases were in the last stage; but more than half of the cases that were clinically hopeless showed no diazo reaction, and in some cases that were wholly unfavorable, the reaction disappeared during temporary improvement. The author considers, therefore, that the **reaction does not permit any definite prognostic conclusions**.

Treatment.—The article of E. von Behring,³ which has caused much excitement, may be considered under the heading of treatment because of the hopeful suggestions that he thinks he is justified in giving. He discusses the results of his method of **vaccinating cattle against tuberculosis**, which consisted in the use of a human culture that had been cultivated in the laboratory for 8 years, and dried at room temperature in vacuo; the culture retains its virulence for at least 4 weeks after being dried. The first dose was 0.004 gram in emulsion in water, injected intravenously. **No harm was done by the injections**; but occasionally there was, in animals 7 months old or older, fever for several days, with loss of appetite. These symptoms occurred in cases in which there was just suspicion of the previous existence of tuberculosis in the

¹ Jour. Am. Med. Assoc., Feb. 21, 1903.

² Zeit. f. Tuberk. u. Heilst., 1902, p. 406.

³ Berl. klin. Woch., March 16, 1903.

animal. Animals more than a year old, however, sometimes reacted so energetically to the injections that they seemed to be in danger, and the reaction was sometimes followed by a pneumonic infiltration of the lung. This excessive reaction the author considers as an indication that the animals have already been infected with tuberculosis. He advises using the injections **solely in animals less than a year old**. On account of the impossibility of using injections of tubercle bacilli to immunize human beings, Behring has considered the **possibility of administering antibodies obtained from animals that have been rendered immune to tuberculosis**. He is convinced that the **great period of danger from tuberculosis infection is in infancy**, and that the **infection occurs particularly through the intestine**. He believes that it is very common for infection to occur in infancy, but not to become evident until a prolonged period has elapsed. He has therefore devised the plan of **feeding human sucklings with the milk of cows immunized against tuberculosis**, with the idea of carrying the children beyond the most dangerous period. He is unable to state, as yet, whether such a method of immunization would be at all practicable. The method needs experimental study with animals before it can be properly carried out. The author is making some observations upon calves, feeding them with the milk of immune cows. As to bovine tuberculosis, he believes that he has demonstrated that his method **does protect cattle from subsequent infection with bovine tuberculosis**. He thinks that he has shown definitely that cattle may acquire tuberculosis in very early life, and may show no evidence of the presence of the disease for at least months afterward. He states positively his belief that **tubercle bacilli may pass through the undamaged intestinal mucous membrane** without leaving a lesion behind, and set up a primary glandular tuberculosis.

L. Pearson and S. H. Gilliland¹ also report some **experiments in immunizing cattle against tuberculosis** that are along the same line of like interest and importance. In brief, they consisted in inoculating a series of young cattle with cultures of human tubercle bacilli **in increasing quantity**, the culture used being of low virulence. The cattle did not acquire tuberculosis from these injections. In one instance, a culture of bovine bacilli was subsequently inoculated intraperitoneally; and this animal showed only a few nodules containing tubercle bacilli, which were apparently abscesses at the sites of the previous inoculations. An animal inoculated at about the same time with the same culture, died about six weeks afterward with extensive tuberculous lesions. This apparently indicates that the animal previously inoculated with the human culture had acquired **increased resistance to a virulent culture of bovine origin**. Another series of 4 animals, 2 of them having previously been vaccinated and 2 being used as controls, were investigated. They were injected intratracheally with a standard suspension of bovine tubercle bacilli. The vaccinated animals were practically free of tuberculosis; one of them showed a slightly caseous nodule, which was entirely limited. The control-animals had widespread tuberculous lesions. These results indi-

¹ Phila. Med. Jour., Nov. 29, 1902.

cate that intravenous injections of much larger quantities of culture of human sputum tubercle bacilli than are necessary to confer a high degree of resistance of immunity upon the vaccinated animal may be administered without danger to that animal, and will apparently produce an increased degree of resistance or a certain amount of **immunity to virulent bovine bacilli**. Experiments with the purpose of testing the duration of this immunity and the extent to which it is effective in protecting cattle against infection from natural sources are in progress. The authors will also attempt to determine the minimum quantity of nonvirulent bacilli necessary to confer a serviceable degree of immunity, and to find out whether the vaccination may be simplified by using successive injections of a few cultures of progressive degrees of virulence.

F. Klemperer¹ has studied the **effect of injections of acid-fast saprophytes (pseudotubercle bacilli) upon subsequent tuberculous infection**. He believes that he has demonstrated that they **modify the subsequent tuberculosis favorably** and afford a certain amount of immunity. He thinks that the two classes of bacilli are related to each other; that tubercle bacilli may be looked upon as acid-fast saprophytes that have become parasites. He does not, however, think it probable that any results of therapeutic importance will be obtained from attempts to produce immunity by the use of the acid-fast saprophytes.

F. Rosenberger² contributes some observations on the **treatment of tuberculosis with tuberculin**, using the method of Götsch. He injects very minute doses of tuberculin-R, and gradually increases up to 1 mg. When this amount can be borne without any symptoms, he begins with 0.1 mg. of the old tuberculin. The treatment seems to improve the appetite; and in a case of tuberculous cystitis in which the urine was of actually milky appearance and in which treatment for 2½ years had been entirely unsuccessful, the symptoms were much relieved and the urine became entirely clear. No special effect upon the pulmonary condition was observed, except that one man that had never previously had hemoptysis, had slight **hemorrhage after the injection** of 0.001 mg. of TR. The author, however, attributes this to previous energetic exercise. In one case the injections produced the early appearance of the menses; and in another, the menses appeared after a six months' intermission. The use of tuberculin was stopped because in 2 cases, after the use of a new supply of tuberculin, **very grave collapse that was almost fatal occurred**. The urine contained albumin in one of these cases and urobilin in the other, and both showed the diazo reaction, which had previously been absent. It could not be determined that this tuberculin was in any way defective, but the collapse appeared to be definitely due to the injections. The author, therefore, recommends that if this method of injection, which seems to be of some use in the treatment, be carried out, or if tuberculin be used at all, **any new supply be always first tested** by using it in very minute doses, in order to avoid any unfavorable effects.

¹ Zeit. f. klin. Med., Bd. xlviii, Hefte 3 u. 4.

² Centralbl. f. innere Med., May 4, 1903.

J. Mitulescu¹ has carried out a study of the **nitrogen and phosphorus metabolism before and after the use of the new tuberculin** in tuberculous subjects. He finds that when the patient is fairly free from general symptoms and the use of tuberculin does not cause a reaction with fever, nitrogen and phosphorus metabolism are undisturbed; if, however, there is already a tendency to the breaking-down of tissue, or if fever and other general symptoms follow the injections, there is a nitrogen and phosphorus loss that indicates a breaking-down of body-protein, and the reaction also causes the patient to take less food. After the reaction is passed, the patient usually shows a nitrogen and phosphorus retention, indicating an increase in body-protein.

N. D. Bardswell and J. E. Chapman,² in discussing the **dietetic treatment of pulmonary tuberculosis**, refer to their experience in sanatorium treatment. They find that an **equivalent amount of proteid has a much greater effect** in producing arrest in tuberculous processes than either fat or carbohydrate. It is easier for a consumptive to use large amounts of proteid than to use large amounts of other foods. It can be given most easily in the form of milk, to which artificial casein-preparations may be added; and it causes the patient to put on weight very rapidly, which is in itself an advantage. The **absorption of proteid**, the authors find, is normal on moderate diets, and only slightly below normal on very large diets. The fat absorption remains high, even when very large amounts of fat are given. Probably only acute diarrhea, and perhaps lardaceous disease of the intestine, interfere distinctly with absorption. Even marked symptoms of dyspepsia may coexist with normal absorption. The signs of **atonic dyspepsia**, however, are **of great importance in relation to diet**; and it is important to control the diet in relation with the dyspeptic symptoms, the chief point being to persist in giving a moderately generous diet, but to reduce the bulk of the food. All indigestible articles and those of low nutritive value, such as green vegetables, soups, sauces, etc., should be excluded. It is also to be remembered that **consumptive patients may be overfed**. This may produce or increase dyspnea, and overtax the lungs and the heart. The diet used by the authors is 120 to 160 gm. of proteid daily for men, with an amount of fat and carbohydrate sufficient to supply current demands and to restore wasted fat at a moderate pace. They believe that a **small increase beyond the physiologic diet is quite sufficient** to insure an improvement in the lung-condition equal to that produced by overfeeding, and that there is much less risk of injurious consequences and much less discomfort to the patient.

G. Schroeder³ discusses the **medicinal and nutrient treatment** of tuberculosis. He strongly recommends Buchner's alcohol pack. He employs alcohol externally in all cases of laryngeal tuberculosis, and uses it as a means of reducing fever in pulmonary cases. He does not recommend the use of alcohol internally. Arsenic and sodium caco-dylate, he thinks, are, at best, of doubtful value. He believes that free

¹ Deut. med. Woch., Sept. 25, 1902.

² Brit. Med. Jour., Nov. 1, 1902.

³ Zeit. f. Tuber. u. Heilst., July, 1902.

iodin is useful, and suggests giving potassium iodid internally coincidentally with inhalations of turpentine, with the idea of setting the iodin free. He recommends pyramidon for the fever. Among the inhalation-preparations he recommends forman; and among nutrients, roborat and eubiose.

D. Turner¹ insists that **creasote and guaiacol are largely abused** in cases of phthisis. In the greater proportion of cases, he believes, the continuous administration of these medicines, particularly in large doses, will sooner or later derange the digestion and do actual harm. He thinks that they may safely be given through the skin, but that their use as commonly practised does much more harm than good.

D. Turner² states that he has had excellent results from the external use of a combination of 4 drams of **creasote or guaiacol**, 1 dram of **oil of citronelle, and cod-liver oil** sufficient to make 4 ounces. The employment of this mixture in oil-massage saves the stomach and, the author states, controls the symptoms strikingly.

Zybulski³ recommends **subcutaneous injections of soda arseniate** in the treatment of phthisis. Ten persons were treated with this method, and 4 were notably improved. The use of arsenic in this way does not upset digestion. The author also claims that it does not irritate the kidneys.

O. Amrein⁴ discusses the results obtained in 13 cases of pulmonary tuberculosis with the **hetol** treatment. The only positive benefit that he thinks could be claimed is that in one case the fever lessened. He saw no harmful results.

Hirtz⁵ reports 2 cases of Addison's disease treated with subcutaneous **injections of suprarenal extract**, resulting in almost entire recovery. Coincident pulmonary tuberculosis was very favorably influenced. The author therefore used these injections in a series of tuberculous subjects, with what he considers very striking improvement.

R. F. Williams⁶ recommends the use of **electric-light baths** in the treatment of pulmonary tuberculosis, and reports a case in which this treatment apparently did good.

Karl Spengler,⁷ after discussing **thoracoplasty and the disinfection of phthisical cavities**, refers to the use of **inhalations of a formalin-alcohol-ether mixture**, made up of 5 cc. of formalin, 20 cc. of absolute alcohol, and 75 cc. of chemically pure ether. He states that he has seen the primary and the secondary infection and the excessive secretion of sputum greatly improve in cases of phthisis, putrid bronchitis, and ozena, after the use of this mixture. He has the patient at first put 10 drops of the fluid in an ordinary drinking-glass, and take about 10 deep inhalations, exhaling outside the glass, in order to prevent the condensation of moisture in it. The strength of the inhalations is gradually increased. The author states, however, that using 40 drops 6 times

¹ Intercol. Med. Jour. of Australasia, Sept. 20, 1902.

² Lancet, Oct. 18, 1902.

⁴ Lancet, July 12, 1902.

⁴ Lancet, July 12, 1902.

⁶ Bull. gén. de Théráp., July 30, 1902.

⁶ Virginia Med. Semi-Monthly, July 11, 1902.

⁷ Deut. med. Woch., April 30 and May 7, 1903.

³ Münch. med. Woch., Aug. 19, 1902.

⁶ Bull. gén. de Théráp., July 30, 1902.

a day is about the extreme upper limit of safety; because, when larger quantities are inhaled frequently, an evil effect upon the general condition of the patient may be observed. This may be followed by a more rapid growth of the bacilli. The best method is to **make frequent examinations of the sputum.** If the bacilli tend to increase and to be found in large clumps, it is time to reduce or to stop the inhalations. If the tubercle bacilli disappear from the sputum, it is also usually time to stop the inhalations.

V. Rudolph¹ describes an apparatus that he has devised for **administering antibacterial gases by inhalation.** The use of inhalation has, he thinks, been unsatisfactory, and the author believes that this is due to the fact that the substances administered did not reach the lungs, because they were not in gaseous form. His apparatus, he claims, yields them in gaseous form, and it can be used for hours at a time, without causing exhaustion or irritation. He claims that he has demonstrated by experiment that it kills various organisms, particularly tubercle bacilli; and his experience indicates that it causes striking improvement in pulmonary conditions, and especially in pulmonary tuberculosis. After its use, the tubercle bacilli in the sputum are said to show changes in staining that indicate **degenerative alterations.**

W. A. Freund² describes the occurrence of a **newly formed joint in connection with the first costal cartilage** in certain cases, and recommends the artificial production of such a joint by operative measures in cases of stenosis of the upper thoracic aperture in persons of phthisical habit, and also in recurring tuberculous disease of the apex. He advises cutting through the first costal cartilage, and considers that muscular activity will prevent subsequent union, and that a pseudarthrosis will gradually form. The operation is, he believes, without danger.

Pianori³ directs attention to the fact that certain authors have insisted that the chief reason that a particular portion of the apex of the lung is usually involved in the early stages of phthisis is that there is an **imperfect development of the first rib**, which produces a sulcus in the lung at this point. Freund recommends the resection of this rib and the production of a pseudarthrosis. Pianori has investigated the condition in a series of cases, and believes that this sulcus-formation is probably a distinct predisposing factor in the development of tuberculosis. He does not think, however, that so rigid a treatment as that recommended by Freund should be carried out, but believes that the same result can be achieved by specially devised gymnastic exercises which will develop the upper part of the chest.

H. M. Tickell⁴ has used rectal **injections of gelatin** in 5 cases of hemoptysis, with rapid and excellent results.

F. C. Shattuck⁵ discusses the **prognosis and treatment of tuberculous peritonitis** on the basis of a study of the cases admitted to the Massachusetts General Hospital between 1889 and 1900—98 in number.

¹ Therap. Monats., 1902, No. 8.

² Berl. klin. Woch., Aug. 18, 1902.

³ Gaz. degli Osped., 1902, No. 120.

⁴ Lancet, Feb. 28, 1903.

⁵ Am. Jour. Med. Sci., July, 1902.

Those that were discharged were followed, as far as possible. The end result is known in 57 cases. Over 57 % of the whole number of patients were between 15 and 30 years of age, but children are admitted to this hospital only in small numbers. Among the points in symptomatology, it may be noted that the disease had a gradual onset in 66 cases, abdominal pain occurred in 68, and 63 showed fluid in the peritoneal cavity; and that of 26 cases in which the abdomen was tapped, 22 showed clear fluid. Masses were recorded in 29 cases. Of 13 in which tuberculin was used, 8 gave a positive reaction, 3 were negative, and 2 unsatisfactory. The test is recommended as being frequently of **marked diagnostic value, particularly when negative.** Out of a total of 46 cases, 34 showed an absence of leukocytosis. Of 25 patients treated on the medical side, 68 % died; 32 % are now well, having had no return of symptoms, or have had a recurrence and are now well. Of 32 surgical cases, 37.5 % were fatal; 62.5 % improved, are well, or have had a recurrence and have since recovered. The conclusion is that if, after a month or six weeks of medicinal treatment, the patient fails to improve, or if he earlier seems to be losing ground, **surgical treatment should be advised.** These patients should not be kept in the hospital longer than necessary, but should receive open-air treatment.

MALARIA.

Etiology and Symptomatology.—G. A. Williamson,¹ in discussing **malaria in Cyprus** during a period of 12 months, states that of 729 cases examined for parasites, 503 were diagnosed malaria, and 470 of these showed parasites. The majority of the cases occurred between July and October. The author believes that when the winter, and particularly the spring, **rainfall is slight, malaria shows but slight prevalence;** when the contrary conditions are seen, the disease is more prevalent. With frequent and severe autumn and early winter rains, malarial prevalence is slight; and the contrary of this statement is also true. He believes that there is a certain **correspondence between the atmospheric temperature and the prevalence of malaria.** The majority of cases occurred during the months in which the weather was hottest. Tertian malaria was seen earlier than estivoautumnal. Multiple infection was marked during the season of the greatest prevalence of the disease. The author saw no case of hemoglobinuric fever. He has had excellent results from the hypodermatic use of the acid hydrochlorid of quinin. Anopheles maculipennis was found to be common in the island.

M. D. O'Connell,² discussing **environment as a cause of ague**, insists that the disease occurs chiefly in a hot, moist, stagnant atmosphere; and, he believes, in the absence of malarial parasites. He makes the entirely unproved assertion that the atmospheric conditions produce altered physical conditions in the body, which give rise to the paroxysm, and that they also produce changes in the corpuscles, which are mistaken for parasites.

¹ Brit. Med. Jour., Sept. 27, 1902.

² Lancet, Sept. 6, 1902.

H. S. Patterson¹ has investigated the occurrence of **estivoautumnal fever in Manhattan Island** and in the surrounding region, and states that it is apparently evident that this variety of fever is now one of our domestic diseases; a certain number of cases have occurred in which there was no evidence of the affection having been acquired in tropical or subtropical regions. The infection took place from imported cases that developed at the time of the Spanish War and later.

N. Jancso² reports a very interesting observation concerning a small **hospital epidemic of malaria**. The cases occurred in Kolozsvar in November. Malaria had practically never appeared there at that period of the year previously to this, and cases developing in the hospital had never been known before. It was at once suspected that the infection had taken place through some anopheles that the author had collected some time before, which had been allowed to suck the blood of a malarial patient for purposes of study. Through the carelessness of an attendant, a considerable number of the insects had escaped from the cage in which they were kept. This occurred on November 14. The first case of malaria developed on the 26th; and after this there occurred within a short time a total of 9 cases of the disease, one case being fatal, from pneumonia. Anopheles were found, in almost every instance, in the room in which were the patients that developed malaria, and the epidemic at once ceased after the insects had been destroyed. This is apparently a clear demonstration of the transference of the disease from one human being to others, through the agency of the anopheles. Jancso insists that, in order to **avoid such an occurrence**, one should not depend upon the consciences of servants; and that all such experimental work should be conducted in a room in which the windows and doors are screened, so that if mosquitos escape they can readily be caught again. In two instances the **infection occurred in typhoid patients** that were in the period of defervescence.

H. Soulie³ has investigated the **relation of the Culicides to malaria** in Algeria, reaching the conclusion that malarial plasmodium cannot develop in these insects.

P. Mühlens,⁴ after a study of **malaria in various regions of northwest Germany**, comes to the conclusion that, after having been a great rarity for 20 or 30 years, malaria reappeared in 1901, and even more in 1902, in **epidemic form**. The cases are of mild character, are confined to marshy regions, and occur only where Anopheles or its larvae can be found. The author notes that most of the persons affected have not been under a physician's care, that many of them have taken no quinin, and that a very large proportion are school-children. Consequently, he thinks that a **further spread of malaria should be anticipated**, and that measures should be taken to control its spread.

E. Martini⁵ contributes a study of a **malaria epidemic in the Har-**

¹ Med. Rec., Sept. 6, 1902.

² Deut. Arch. f. klin. Med., Bd. lxxvi, Hefte 4 u. 5.

³ Compt. rend. de l'Acad. des Sci., cxxxv, No. 2.

⁴ Deut. med. Woch., Aug. 14 and 21, 1902.

⁵ Deut. med. Woch., Oct. 30, 1902.

Lingen and Jeverland regions in Germany. It occurred in 1901, in a region that had previously been practically free from this disease for years. It was apparently determined positively that the origin of the epidemic was from some Dutchmen that were building dikes. These men were infected with malaria, and they apparently infected the natives of the place first infected; from here, the epidemic of malaria spread to quite a wide region round about.

Reckzeh¹ reports 3 cases of malaria developing in **persons who had never been out of Berlin**. The method of infection in these cases was not determinable. He also describes a fourth case, one of chronic malarial cachexia. This was of interest because the patient died of cancer—an observation of importance in relation to the **suggested antagonism between malaria and cancer**.

J. Goldschmidt,² in discussing the question concerning the **relation between malaria and carcinoma**, states that in Madeira the former is practically unknown. If malaria protects against carcinoma, the latter should be very common in Madeira. The contrary is true, however, for it is very rare.

W. MacGregor,³ in a lecture on malaria, states that the mortality from "fever" in the natives of India in 1900 was over 4,900,000; and that the admissions for malaria during the year were, in the European troops, over 18,000; in the native troops, over 39,000; and in the convicts, over 43,000. The **mortality from malaria among young children** the author considers extremely high. The total number of deaths in the Lagos region, where he was situated, was 864 in children under 1 year, during the year 1899; 321 of these were due to fever. MacGregor and Best have recently examined 320 children in that region, all under 15 years of age; 45 % of these had tropical ring-parasites in their blood, and 5 % had pigmented parasites. **Of those under 2 years of age, 86 % were infected.** The author believes that this disposes of the question of a racial immunity of the natives. As to the use of quinin, he states that it makes comparatively little difference how it is taken, so that an adult absorbs at least 15 grains a week. He discusses the general methods of prophylaxis of malaria, stating that in India they have introduced Koch's quinin-prophylaxis, Ross's method of exterminating mosquitos, and netting. The results are believed to be encouraging. MacGregor does not agree with those that think that the salinity of the water prevents the growth of mosquitos. He has found that in highly saline water swarms of living larvae are present in certain regions in Egypt. He highly disapproves of the attempt to segregate Europeans and protect them, letting the natives take care of themselves. He believes that blackwater fever is very closely related to malaria. In the treatment, he recommends subcutaneous saline injections or the use of saline enemas.

A. Billet⁴ discusses **malaria of typhoidal form**. In an epidemic in Algiers in 1900-1901, he noted many atypic forms of malaria; particu-

¹ Deut. med. Woch., April 23, 1902.

³ Brit. Med. Jour., Dec. 20, 1902.

² Deut. med. Woch., July 10, 1902.

⁴ Rev. de Méd., 1902, p. 1019.

larly the typhoidal form. Forty of the latter type were observed in 400 cases of malaria; 2 died. This form of the disease is characterized by the occurrence of epistaxis, headache, stiffness and pains in the limbs, prostration, stupor, delirium, and other severe nervous symptoms, a dry and coated tongue, diarrhea and meteorism, and often tenderness in the right iliac fossa; and the spleen enlarges markedly. Rose spots are absent; the Widal reaction is negative; the temperature-chart shows decided remissions and sudden elevations; and malarial plasmodium are found. The author also noted a leukocytosis in these cases, and particularly an increase in the mononuclear elements, chiefly of the large mononuclear cells. The rapid effect of free quinin-therapy was also distinctive.

Moore¹ reports a case of tertian malaria in which he observed rigidity of the neck, Kernig's sign, and loss of taste and smell. These **symptoms led to a diagnosis of meningitis.** Typical malarial parasites were, however, found in the blood; and, under the use of quinin, the fever and the meningeal symptoms disappeared, the loss of taste and smell persisting longest.

Complications.—F. G. Hopkins,² in discussing hemoglobinuric fever, states that in one region in Africa, with about 10,000 inhabitants, 800 feet above sea-level and 160 miles from the coast, he **found over 35 % of all persons to be infected** with malaria. In those under 5 years of age, over 70 % showed infection. Hemoglobinuric fever is very common in this town. The author believes that it has been definitely shown that where malaria is uncommon hemoglobinuric fever does not exist, and that where the latter is common malaria is common also. He says that, with very few exceptions, he has found the malarial parasite in the blood of hemoglobinuric-fever patients—only, however, before the attack or during convalescence; never during the height of the hemoglobinuria. He says that he has never seen this condition occur in a regular quinin-taker or in one that has been carrying out malarial prophylaxis. He has **found leukocytosis to be common at the beginning** of the attack and for a long time after it. The most successful treatment he considers to be that of Gouzieu, which is practically **subcutaneous injections of from 100 cc. to 300 cc. of normal saline solution** daily; a simpler method is to inject the saline solution into the rectum. In treating the attack, he says, phenacetin does no harm. [This statement must be subject to question, in view of the case abstracted in last year's YEAR-BOOK.] He insists that the condition is undoubtedly malarial.

F. M. Hartsock³ reports a case of **blackwater fever from the Philippines**, ending fatally. The pains in the loins began on May 27, the day of the patient's admission. Quinin was administered the following day. The urine showed a dark color on May 29. The condition is said to be rare in the Philippines.

F. T. B. Fest⁴ believes that **cachexia is not the essential cause of**

¹ St. Louis Courier of Med., Aug., 1902.

³ N. Y. Med. Jour., Sept. 13, 1902.

² Dublin Jour. Med. Sci., June, 1903.

⁴ Inter-State Med. Jour., ix, part 4.

hemorrhages in malaria. In 5 cases observed by him in which there was no cachexia, there was marked hematemesis. There were large numbers of tertian parasites, which were of unusual size; and he thinks that the **parasites produced the hematemesis** by causing occlusion of the capillaries. Vomiting results from the irritation of the stomach, and the distended capillaries tend to rupture. If many capillaries or somewhat larger bloodvessels rupture, there will be hemorrhage of considerable amount, particularly in cases such as alcoholism, in which there is already a congested condition of the stomach.

M. Luzzato¹ reports 2 cases of hemoglobinuria in members of the same family, both of whom had malaria. Their father had also had hemoglobinuria and had died of malaria. The author believes that in the father's case the hemoglobinuria was due to quinin, but thinks that in these two patients it was not due to quinin, but to a **hereditary predisposition**.

R. Ruge² reports a case of **blackwater fever** that occurred in a man who had **never previously had malaria**, and who had taken prophylactic doses of quinin for more than a month, throughout the whole time that he had been in Africa. The attack of hemoglobinuria was produced by a subcutaneous dose of 5 grains of quinin. The malaria was finally controlled by the rectal use of that drug, the enemas being well borne. One of the most interesting points was that for some time preceding a second outbreak it was noted that the red blood-cells showed **a marked polychromatophilia**; and that there were numerous macrocytes, microcytes, and shadow-cells.

C. W. Schlayer³ reports a case of blackwater fever, occurring in a subject of malaria, which was certainly **not produced by quinin**, because that drug had not been used at the time. The patient had, however, been given a dose of about 12 grains of phenacetin. The author believes that the occurrence of blackwater fever is due to degenerative changes in the blood-cells, set up by malaria, which render these cells **particularly susceptible to the action of drugs** that act destructively upon the blood. Quinin is one of these; but there is a whole series, probably belonging to the same class—the coal-tar products, the salicylates, sulfuric and hydrochloric acid, and a number of others. It is probable that the attacks can be **produced also by other factors than drugs**, such as overstrain, excitement, severe exposure to weather, etc.

P. Schmidt⁴ reports a case of tropical malaria in which hemoglobinuria followed the use of quinin, and in which, subsequently, methylene-blue was used for fear that quinin might cause a renewed attack of hemoglobinuria. After the administration of 45 grains of methylene-blue in 4 days, there was a renewed, sharp attack of hemoglobinuria. This is apparently the first instance of **hemoglobinuria following the administration of methylene-blue**. The author also notes that in this case he saw parasites that were apparently **intermediate stages between the ring forms and the half-moon forms**. These he had never before

¹ Rif. med., Feb. 11, 1903.

³ Deut. med. Woch., July 10, 1902.

² Deut. med. Woch., July 10, 1902.

⁴ Deut. med. Woch., Oct. 30, 1902.

discovered in the circulating blood. He thinks it probable that the transformation occurred in the bone-marrow.

Mann¹ reports a case in which there was a coincidence of **malarial hemoglobinuria and uncinariasis**. The case was reported with particular reference to Koch's statement that hemoglobinuria occurs in malaria only when some other influence than the malaria has damaged the red corpuscles and has aided in the production of hemolysis. The patient reported was an officer that had already had malaria and hemoglobinuria in Cameroon. The hemoglobin-content of his blood was about 60 %. He looked very anemic and had marked enlargement of the spleen. He had had an attack of hemoglobinuria immediately after an injection of quinin. This was repeated later; and afterward, after a dose of quinin internally, he had an attack of hemoglobinuria. It is a notable fact that there was a sharp rise of temperature after the administration of the quinin and just preceding the hemoglobinuria in each of the 3 instances. This fever with hemoglobinuria, the author believes, is due to the destruction of plasmodiums by the quinin and the consequent setting-free of poisonous substances into the circulation. The fever produced in hemoglobinuria by the administration of quinin is, then, actually malarial fever, according to his view. The presence of uncinariasis in this patient he considers to be the **contributing cause of the hemoglobinuria**; and he suggests the importance of looking for this infection in other cases of this kind.

Dolbey² reports a case of **total melanism** in a man of 30 years. The pigmentation began to exhibit itself soon after an attack of malaria, and involved the head, the hands, and the feet. It then gradually spread over the entire surface of the body. It was of a coppery brown color, and in some places was almost black. The finger-nails were of normal color, and the palms and soles were but slightly pigmented. The patient's general condition was quite satisfactory, with the exception of frequent elevations of temperature, and the fact that after marked exertion he had a tremor of the head, with dyspnea and tachycardia. He had had no attack of malaria within 4 years at the time of the report, and **plasmodiums could not be found in the blood**; but the pigmentation was considered certainly to be the result of malaria, as Addison's disease could be readily excluded and the man had not taken arsenic.

Diagnosis.—R. Ross³ reports a new and **improved method for the microscopic diagnosis of intermittent fever**. It is carried out by taking a large drop of blood, amounting to about 20 cmm., on a glass, slightly spreading this out by means of a needle or lancet, drying in the air without fixing, and then laying on the surface, by means of a glass rod, a quantity of aqueous eosin-solution sufficient to cover the film of blood. This is allowed to remain for about 15 minutes, and in this time it removes the hemoglobin of the dried but unfixed corpuscles, at the same time staining the stromas of the corpuscles, the leukocytes, the blood-plates, and the parasites. The eosin is then washed off with a

¹ Deut. Arch. f. klin. Med., Bd. lxxiv, Hefte 5 u. 6.

² Brit. Med. Jour., Dec. 27, 1902.

³ Lancet, Jan. 10, 1903.

very gentle stream of water. Next a weak solution of methylene-blue is run over the film and allowed to remain for a few seconds. This is washed off very gently, and the preparation is complete. The duration of the staining with eosin and methylene-blue is in inverse proportion to the strength of the solutions used. The advantage of this method is that a **large amount of blood may be satisfactorily examined with great rapidity.**

R. Ruge,¹ as an improvement of the method for the microscopic diagnosis of malaria recently described by Ross, recommends that one make thick smears on cover-glasses and then **fix in a 2 % solution of formalin**, containing 0.5 % to 1 % of acetic acid. Otherwise, the blood would often be entirely washed off the cover-glass. This mixture fixes the blood and yet permits of the removal of the hemoglobin in a few minutes. The preparation may then be stained with Manson's solution or by Romanowsky's method. In the latter case the rapidity of the method may be increased by warming. The precipitates that always form may be washed away with alcohol. The plasma of the parasites does not stain well when fixed in formalin and stained by Romanowsky's method, but the staining may be made satisfactory by first staining by Romanowsky's method and then with dilute Manson's solution. The preparations so obtained are not elegant in appearance, but they permit of the rapid examination of large amounts of blood.

J. Koreck² discusses the technic of **staining malarial organisms**, and describes a series of experiments that he has undertaken with various mixtures of methylene-blue, eosin, acetone, etc. He concludes that he has made a decided advance by the use of **collargol**, instead of other forms of silver. The mixture he recommends is 100 cc. of 1 % methylene-blue and 0.5 gram collargol, this being shaken energetically, and filtered after a few hours. This is neutralized in the proportion of methylene-blue, 1 part; eosin, 0.88 part. The results are better than with Ziemann's method, and the result of staining after 15 minutes is, he states, excellent. One may also use acetone with the following proportions of solution: methylene-blue-collargol solution, 1 part; acetone, 2 parts; distilled water, q. s. ad 10; eosin, 0.8 to 1.5 parts. The best strength of eosin to use is 0.8.

Mariotti-Bianchi³ refers to the fact that only the ring-forms of the estivoautumnal parasites are found in the circulating blood, while it has been considered impossible to find the adult forms except by puncture of the spleen or by postmortem examination. He states that in examining 600 cases of estivoautumnal malaria, he found in 4 instances the **adult parasites in the peripheral blood**. He believes that this occurs only in very severe cases, in which the individual resistance is low. He has, in some instances, been able to follow the development of asexual forms into adult gametes. As to the time of the appearance of semilunar forms in the blood, he found them in one case directly after the first paroxysm. Other authors have found them only after 8 or 9 days.

¹ Deut. med. Woch., March 19, 1903. ² Deut. med. Woch., April 23, 1903.

³ Rif. med., No. 161, 1902.

J. T. Moore¹ reports some observations showing that the **flagellums of the malarial parasite are fertilizing elements.** The same observation has been previously made by MacCallum and by Warfield and Pancoast. Moore observed in the blood from an estivoautumnal case of malaria, a granular and a nongranular body near together. The hyaline body soon exhibited active motion and flagellums were thrown out. One freed itself. Plunging about, it finally came into contact with the granular body and entered it. The pigment of this body, which was ring-shaped, soon became irregularly distributed. This fertilized body showed no further change in the 20 or 30 minutes during which it was watched. The body that had flagellated soon became inactive and showed evidences of disorganization.

C. H. Melland² reports some work on the **leukocytes in malaria**, and reaches the conclusion that cases of malaria constantly show, at some period, an increased percentage of large mononuclear leukocytes; but this is during the period in which the patient is free from fever. No positive conclusions could be drawn from the leukocytes during the period in which there is rise of temperature, or shortly before the rise. The author believes that in a case suspected of being malaria, the presence of **10 % or more of large mononuclear cells** is strong presumptive evidence that the case is one of malaria. If less than 8 % of these cells are found, it is probable that the case is not one of malaria. The aggregate of large lymphocytes and large mononuclears is of no value in the diagnosis. Melland has not observed the great proportion of large mononuclears described by some authors, his highest percentage being 23. In some cases of undoubted malaria he has found less than 10 %, and even below 5 % of large mononuclears.

T. H. Delany³ contributes some observations on a series of cases, some of which were malaria, others were diseases resembling malaria clinically. He presents **studies of the red and the white cells**, with differential counts of the latter. He also thinks that when in a disease that resembles malaria there is a percentage of large mononuclears above 12, the disease should be diagnosed malaria. Excluding some rather irrelevant cases, he finds that over 90 % of the cases of malaria exhibited a percentage of 12 or above this; while of the 53 cases here noted, only 17 % showed parasites at a single examination. He also found the lymphocytes largely increased. He **frequently found myelocytes** in small number, and the hemoglobin was much less diminished than the red cells. If the white corpuscles are down to 1500 or less, the prognosis is usually grave, and quinin should be used hypodermatically at once. The author refers to observations made by Rogers, demonstrating the association of **marked atrophy of the mucous membrane of the small intestine** with the failure of immense doses of quinin by the mouth. The increase in the large mononuclears becomes marked only after fever has been present for some days. [In 1 % of these cases it was not present after 8 days.] This fact accounts for some of the failures to find a striking increase in

¹ Johns Hopkins Hosp. Bull., Oct., 1902. ² Brit. Med. Jour., Sept. 27, 1902.

³ Brit. Med. Jour., March 28, 1903.

the large mononuclears. If leukocytosis is present from any cause, the large mononuclears may not be relatively so much increased; though they are absolutely so. This point also must be considered. Likewise, if the fever is high at the time of the count, the percentage of leukocytes may vary from that which is usual. The **presence of leukocytosis is almost diagnostic of liver-abscess, as against malaria;** but in 4 cases reported in this paper leukocytosis was present in what was **apparently uncomplicated malaria.** This the author, with Manson, believes to indicate a grave infection. He also describes some cases showing the value of a blood-examination in the diagnosis of postoperative and postpuerperal fever in the tropics.

Treatment.—Gilblas¹ discusses the recommendations made by the Society of the Southern Italian Railroads for the Study of Malaria, and the results obtained therefrom. He considers that the **use of mosquito-netting has had astonishingly satisfactory results;** while the use of prophylactic doses of quinin every 5 days and the continuous use of arsenic have had some effect, though one much less marked. Malaria has become less common and the attacks are decidedly milder.

L. des Barres,² in discussing the prophylaxis of malaria, insists upon the **isolation** of patients with this disease, to prevent its wide spread.

J. Michon,³ discussing the prophylaxis of malaria, recommends the use of quinin in doses of about 10 grains every 3 days. He considers this method of prophylaxis more likely to be successful than any other, because it is the most practical and the simplest. In one region, for instance, **as the result of prophylaxis, the number of cases has fallen from 90 in 1898 to 8 during the last year.**

A. G. Walsford⁴ insists that **intramuscular injections of quinin** are much more satisfactory and less painful than are hypodermatic injections. He finds that sometimes the latter may even cause more or less prolonged paralysis of one or two fingers, while intramuscular injections are practically painless and the swelling caused by them soon disappears. The author's experience was gained in managing a tropical hospital.

J. Smyth⁵ refers to the fact that McGann used quinin hypodermatically as long as 25 years ago. Smyth considers that the **intramuscular use of quinin should be condemned;** he has seen bad results in his own person. If the drug is injected subcutaneously and the swelling is at once dispersed by gentle friction, no local damage will, he says, be done.

J. T. Moore and W. L. Allison⁶ have investigated the **comparative value of methylene-blue and of quinin in a series of cases of malarial fever.** They agree with others that methylene-blue will destroy malarial parasites in many cases, but think that it is less certain than quinin and more unpleasant. It has no advantage over quinin. It is probably more useful in chronic than in acute cases. Its chief usefulness is in those cases that have an idiosyncrasy to quinin. It would be of importance to determine its usefulness in malarial women who are pregnant. It is prob-

¹ Gaz. degli Osped., No. 99, 1902.

² Bull. de l'Acad. de Méd., May 26, 1903.

³ Brit. Med. Jour., Nov. 5, 1902.

⁴ Gaz. hebdom., Dec. 25, 1902.

⁵ Brit. Med. Jour., Dec. 6, 1902.

⁶ Med. News, Dec. 6, 1902.

able that it would be of value in treating hematuric and hemoglobinuric fever. The action of quinin is, however, more rapid and more reliable.

A. Laveran,¹ in discussing the statement of Gautier concerning the value of **arrhenal** (soda methylarsenate) in the treatment of malaria, refers to his own experience and to that of a number of others with whom he has communicated, and reaches the conclusion that arrhenal is not a specific against malaria; and that, consequently, it is **dangerous to prescribe it instead of quinin**, as valuable time is thereby lost. A. Gautier,² in reply, contributes some personal observations and some observations by others, which, he believes, indicate that while quinin has a much more active and more rapid effect in malaria, arrhenal is, at times, effective when quinin has failed. He especially thinks that the **combined use of these two substances** provides a better method of treating malaria than the use of quinin alone.

H. Corke³ reports a case of blackwater fever treated with liquid extract of **cassia beareana**. Recovery occurred; and the author believes that it was due to the action of this drug alone. Fifteen minims was given, at first every half-hour and afterward every hour.

PNEUMONIA.

A. R. Reynolds⁴ discusses the **increasing prevalence of pneumonia**. He refers to the fact that the consumption death-rate in 1900, as compared with the rate in 1880, had decreased 20.7 % in proportion to population, and 15.2 % in proportion to total mortality. The general total mortality had, in this time, decreased 6.3 %. During this time the pneumonia death-rate had decreased 3.26 % in proportion to population, but had increased 5.57 % in proportion to total mortality, up to 1890; and between 1890 and 1900, it had increased 11 % in proportion to population, and 12.21 % in proportion to total mortality. The deaths in 10,000 of population since 1860 had shown, for pneumonia, an **increase of 349.6 %**; for consumption, a decrease of 39.5 %. Since 1900, pneumonia has **caused the death of one-eighth of all persons dying** in Chicago—one-third more than consumption, and 44 % more than all the other contagious and infectious diseases combined. The author discusses the methods of combating this increase in pneumonia, and recommends that all the precautions adopted in the case of diphtheria should be enforced in pneumonia; and that the public should be instructed in methods of maintaining a proper condition of health. Overcrowded places of assembly should also be watched and kept in as satisfactory order as possible. **General education of the public** he considers the only means of exercising any real control over the disease.

A. H. Copeman⁵ describes a **series of cases of pneumonia in one household**. The disease first occurred in a boy. After this child had been sick 3 days, 2 other children were taken ill. The next day, the

¹ Bull. de l'Acad. de Méd., Dec. 10, 1902.

² Ibid., Dec. 30.

³ Lancet, March 21, 1903.

⁴ Jour. Am. Med. Assoc., Feb. 28, 1903.

⁵ Lancet, Sept. 27, 1902.

mother had the disease; and the father, returning that day from a journey, was taken ill in the evening, his attack ending fatally. In each instance the disease began very suddenly, and was associated with high temperature and with extreme prostration. Investigation showed that the dining-room of the house had a direct communication with the general drain from the premises.

D. W. Wynkoop¹ reports **4 cases of bronchopneumonia** that occurred in rapid succession in 3 children and a trained nurse attendant upon them. All the cases ended in recovery. The author describes 2 other cases with similar symptoms that occurred in members of another family.

W. Müller,² in an extensive study of the **occurrence and distribution of bacteria in pneumonia**, reaches the conclusion that in both aspiration-pneumonia and croupous pneumonia the advance of the microorganisms to different parts of the lungs occurs through the interstitial tissues in the lymphatic tissues of the septa, and that in the very beginning of the disease the lymph-vessels are first affected. The progress in these conditions is, therefore, the same as in experimental vagus pneumonia, and also the same as is the progress of fine particles introduced into the lungs. This interstitial progression of the bacterial cause of pneumonia is already recognized in the cellular pneumonias and bronchopneumonias; hence, the author believes that it is characteristic of all pneumonias. The early involvement of the pleural lymph-channels explains the early pain in the side. Müller has also made a study of the relation of the various organisms found in pneumonias to the course of the disease, the sputum being examined. He **finds no characteristic type of fever or course of the disease associated with any particular form of bacteria**. As a rule, the pneumonia due to the Friedländer organism exhibits a markedly remittent course of the fever; but the same course has been observed in cases in which there was a combination of the pneumococcus with the staphylococcus or the streptococcus. The atypic wandering pneumonias exhibit no characteristic bacteriologic picture. Diplococci were found regularly in the typical cases, with various combinations of other organisms, and sometimes alone. The author admits that these mixed infections and different forms of infection may explain the differences in the course of the pneumonia; but he does not believe that there is any possibility, as yet, of bringing the bacteriologic findings into direct relation with the clinical course.

Galdi³ contributes a very interesting brief discussion of some cases of **pneumonia complicating stagnation in the lesser circulation**. One case occurred during acute endocarditis; it was a striking one, because the patient had an endocarditis that was probably gonorrhreal, and because at necropsy there was found an acute process with a perforating aneurysm of the mitral valve—conditions very favorable to the development of a pneumonia. The patient developed sudden signs that were considered

¹ Med. Rec., Oct. 25, 1902.

² Deut. Arch. f. klin. Med., Bd. xxxiv, Hefte 1 u. 2.

³ Deut. Arch. f. klin. Med., Bd. lxxv, Hefte 3-5.

to be possibly due to infarct of the lung, with hemorrhage and severe dyspnea, dying soon afterward. The postmortem examination, however, showed that there was no infarct. The process was diffuse, and had apparently arisen from the vessels. It was not an ordinary croupous pneumonia. It involved both lungs, a large part of each being consolidated and presenting a grayish-red color. The author believes that this was, in a sense, a stagnation-pneumonia; and that the condition of the heart had made the vessel-walls of the lung particularly susceptible. The second case reported was one of ordinary lobular pneumonia in chronic pulmonary stasis. The author refers especially to the importance of the fact that it is not necessary to have chronic heart-failure in order to produce this condition of stagnation-pneumonia.

J. Lochbihler¹ has made a study of the **urine in pneumonia**, with **particular reference to the albumoses** that influence coagulation of the blood. Precipitation with ammonium chlorid shows the presence of a nucleoproteid, a proteoalbumose and a heteroalbumose, all of which influence coagulation. After removing the sodium chlorid precipitate, saturation with ammonium sulfate was carried out, and showed the presence of deuteroalbumose and albumin; but these did not influence coagulation. It was probable that the nucleoproteids and the albumoses that had an influence on coagulation were derived from the leukocytes. It is known that the leukocytes contain a nuclein body that hastens coagulation and an albumose that interferes with coagulation. In pneumonia, these substances could readily be derived from the exudate.

R. Kun² has carried on some further work concerning the substances discussed by Lochbihler, particularly determining the course of their excretion during pneumonia. He divides them into two groups: those precipitated by acetic acid and those precipitated by sodium chlorid. The first are found in the beginning, in large quantities; they increase rapidly in the beginning, the amount falling about 2 days before the crisis, disappearing about the time of the crisis. The sodium-chlorid precipitate increases up to the day before the crisis, and then falls, disappearing just after the crisis. Both appear again in small amounts after the crisis. The author considers that if, three or four days after the beginning of the pneumonia, there is no increase in the sodium-chlorid precipitate and no decided increase in the acetic acid precipitate, or if, after a fall in both of these bodies, one or both increase again, we **must consider that the case is not going to end by crisis**. His experience leads him to think that these substances are **excreted in small amounts in cases that run a fatal course**.

M. Ascoli and C. Bezzola³ have made a study of the **antitryptic action of the blood-serum in croupous pneumonia** and conclude that there is, in a fresh case of the disease, a marked increase in the antitryptic power. After this, this power is maintained at a high point for a certain length of time, and then, often hand in hand with the decrease

¹ Centralbl. f. innere Med., Aug. 2, 1902.

² Centralbl. f. innere Med., Aug. 16, 1902.

³ Berl. klin. Woch., April 27, 1903.

in the local phenomena, it rapidly decreases. In a case in which resolution was prolonged, the authors found the antitryptic activity increased for an abnormally long time. They believe that this increase in the antitryptic power is a reaction of the organism to the unusual amounts of the products of destroyed leukocytes that are set free in such circumstances, and that it has an important relation to the normal occurrence of crisis and absorption.

H. W. Cook¹ has made a study of **nitrogen-excretion in pneumonia**, with especial reference to its relation to resolution, because it has been determined by various other observers, particularly by Müller's students, that an extremely marked increase of nitrogen-excretion occurs at about the period of the crisis and that this soon falls to normal. He therefore believed that it might be possible to determine the rate of absorption of the exudate and to gain some knowledge of prognostic value by nitrogen-estimations. He followed 22 cases in all. The results were such as to make it unquestionable that this method would not at all indicate the rate of the clearing of the lung. The general conclusions reached are that the amount of nitrogen excreted is usually greater than that which would correspond with the amount of original exudate. He believes that the excess represents, in large part, a continuation of the formation and absorption of inflammatory exudate plus other tissue-destruction. If there is marked delay in resolution, the nitrogen-output continues high. The author thinks that this indicates a continuation of the local inflammatory process; hence, that **there is in such cases really a chronic pneumonia**. In rapid resolution, the leukocyte-curve follows closely the curve of nitrogen-excretion. This, he believes, indicates the correctness of the view that the leukocytes have a close relation with the production of resolution.

H. W. Hoagland² contributes some figures taken from various cities near sea-level and from others at a considerable elevation, to demonstrate his belief that **pneumonia is less fatal in high altitudes**. He thinks that this is chiefly due to the fact that high altitudes stimulate the heart-action and the respiration, and that people in such altitudes usually lead a more hygienic life.

F. G. Connell³ states that in 261 cases of pneumonia at Leadville, Colorado, the death-rate was 26.4 %—just the same as at other altitudes. He agrees with Hoagland that it has practically been **disproved that high altitudes increase the death-rate** from pneumonia.

J. T. Hewetson⁴ reports a series of counts of the **leukocytes in pneumonia**, and insists upon the importance of such counts as a method of diagnosis, prognosis, etc. He refers to the fact that the differential counts in 3 cases of fatal pneumonia showed a distinct relative increase in the polymorphonuclear neutrophiles, though there was no quantitative leukocytosis. Finely granular myelocytes were present in these 3 cases.

Noica⁵ reports a case of **algid pneumonia** in a man of 64. The

¹ Johns Hopkins Hosp. Bull., Dec., 1902. ² Amer. Med., April 4, 1903.

³ Amer. Med., June 13, 1903.

⁴ Birmingham Med. Rev., Aug., 1902.

⁵ Spitalul., 1902, Nos. 18, 19.

attack began with weakness and cyanosis, and superficial respiration, the pulse being very weak. There was no cough and extremely little pain. The rectal temperature throughout the whole course of the disease remained between 97.5° and 99.5° F. The necropsy showed that the whole left lung was in the stage of gray hepatization, the right being normal. There was also advanced atheroma. The author thinks that such cases indicate that the fever is not the direct result of the presence of micro-organisms or of their toxins, but is a reaction of the organism. This patient was already very weak, and his organism was unable to react.

Complications.—D. J. M. Miller¹ reports a case of **femoral thrombosis** during convalescence from croupous pneumonia, the disease having occurred in a man of 44, who, on the eighteenth day of the disease, 36 hours after having regained a normal temperature, developed the signs of beginning phlebitis in the left leg. The author has found, on looking over the literature relating to the subject, 3 cases in addition to the 41 collected by Steiner. He notes as a symptom in his case, and as one that has repeatedly been referred to, a marked sensation of numbness or of "pins and needles," which is probably due to associated neuritis.

E. F. Wells² discusses **endocarditis as a complication of pneumonia**, referring to statistics from literature and reporting a case in which recovery occurred. He decides that endocarditis is an uncommon complication of pneumonia, and also that ulcerative endocarditis is rare in this disease. When endocarditis occurs, it is usually early in the attack. The symptoms are equivocal until ulceration occurs. The mitral valve is commonly affected, though the aortic is more frequently attacked than in other forms of endocarditis. The prognosis of the simple pneumococcal endocarditis is not well established. When recovery occurs, there is little tendency toward cicatrical contraction; the integrity of the valve may be unimpaired, and the patient may regain entirely good health.

F. W. McRae³ reports 2 cases of **abscess of the lung** following acute lobar pneumonia. Both patients were operated upon, and both regained a satisfactory condition of health; the first rapidly, and the second after a somewhat prolonged illness. There is a tabular statement of the other cases in literature, numbering 75.

Treatment.—I. F. Ingals,⁴ in a general discussion of the **prognosis and treatment of croupous pneumonia**, states that 338 cases treated in Cook County Hospital, Chicago, during 15 months showed a mortality of 36 %, the mortality increasing with the age of the patients. The mortality among those treated with cotton-battling jackets was 5 % less than that among those not so treated. The author thinks that during the first 24 hours of the disease ergot tends to diminish the intensity of the symptoms. He believes that in rare cases with undoubted plethora a small amount of blood should be removed. He quiets cough with

¹ Phila. Med. Jour., May 16, 1903. ² Jour. Am. Med. Assoc., Oct. 18, 1902.

³ Jour. Am. Med. Assoc., Sept. 27, 1902.

⁴ Jour. Am. Med. Assoc., Nov. 22, 1902.

ammonium bromid combined with hyoscyamus, which is also important because of its general quieting effect upon the patients. Among other methods of treating insomnia, the author states that full doses of whisky sometimes produce very happy effects. He has seen excellent results from the use of hypodermolysis in well-chosen cases.

F. P. Henry,¹ in discussing the **treatment of pneumonia**, states that pain should usually be treated, in order to promote expectoration and relieve congestion. The methods that he recommends are wet or dry cups, leeches, or the local application of cold. If these measures cannot be employed or are insufficient, morphin should be given hypodermatically. Fever does not need to be treated, unless very high, in which case it should be managed by sponging, the local application of cold, and, if necessary, the hypodermatic use of quinin. He believes that cough may usefully be treated with $\frac{1}{3}$ -grain doses of kermes mineral. Digitalis may be used when there is low tension and engorgement of the veins; otherwise, it is likely to be harmful. Nitroglycerin, he thinks, relieves congestion better than any other drug. The treatment of pneumonia with **quinin** the author considers to be the most important therapeutic advance in this disease of recent years. He has commonly used the hydrochlorosulfate. **Saline hypodermolysis**, in his opinion, often turns the scale in favor of recovery. Venesection is very rarely indicated.

Pelzl² reports a series of cases of pneumonia treated with **pilocarpin in very small doses**. He gives a maximum amount of somewhat less than 1 grain a day, and administers this in 10 separate doses. Used in this way, he has seen no unfavorable effects from the drug; and he claims excellent results, the course of the disease having been shortened and the symptoms having been less severe. In the later stages he considers the treatment useless.

I. L. Van Zandt³ reports the results of a collective investigation of the treatment of pneumonia with **creasote**. Thirty-seven physicians, reporting 762 cases, considered that creasote sometimes aborts pneumonia; 15, reporting 187 cases, consider that it does not; 57, reporting 1022 cases, consider that creasote makes the course of pneumonia less severe. The majority of those who answered had not seen cases that they thought entirely uninfluenced by creasote, and the author believes that the treatment is of extreme value.

PNEUMOCOCCUS SEPTICEMIA.

Spitta⁴ reports a case of **general pneumococcic infection in a child**, the patient exhibiting, during life, empyema, inflammation of the left elbow, and meningitis. The necropsy showed pneumococci in the lungs, pericardium, spleen, and elbow. They had been demonstrated in the cerebrospinal fluid during life, by lumbar puncture.

G. Parker⁵ reports a case of general pneumococcus-infection in a

¹ Phila. Med. Jour., Feb. 14, 1903. ² Wien. med. Woch., Nov. 29, 1902.

³ Med. Rec., Oct. 18, 1902. ⁴ Brit. Med. Jour., Nov. 15, 1902.

⁵ Brit. Med. Jour., May 9, 1903.

child 17 months old, the disease having begun, 2 weeks before admission with bronchopneumonia. When admitted, the child had a normal temperature; 2 days later, the temperature rose to 101°, but soon became normal and afterward showed only slight oscillations. The lungs cleared up, but the breathing remained very rapid. The child had a leukocytosis of over 54,000, the polymorphonuclears being 61 %, and the small lymphocytes 31.6 %; and there was 0.6 % of neutrophile myelocytes. No localized signs could be demonstrated. The patient died suddenly; and the autopsy showed lymph in the anterior mediastinum and over part of the right lung. The middle and lower lobes of the right lung, the upper lobe to a less extent, and the lower lobe of the left lung showed resolving bronchopneumonia. The pericardium contained greenish serum with some lymph. The peritoneum was slightly injected and contained some lymph. The malpighian bodies of the spleen were somewhat enlarged, the bone-marrow was normal, and the kidneys showed only congestion. Blood-cultures from the pericardium and the heart showed a pure growth of the pneumococcus. The lesions outside the lungs were at least as marked as those within them, and it was thought that the **bronchopneumonia might have been a late complication of the original trouble.** The absence of fever for a long time before death was a striking feature.

Baduel and Gargagno¹ report a **family epidemic of infection with the pneumococcus** in which 11 persons were infected. The initial case was one of purulent otitis media. There were 3 cases of pneumonia, 1 of them being complicated with empyema; 4 cases of catarrhal bronchitis, 1 of them complicated with conjunctivitis; and 1 case of ulcerative gingivitis, 1 of parotitis, and 1 of catarrhal sore-throat. In all the cases except that of gingivitis, blood-cultures showed the presence of pneumococci. In all the cases the blood-serum had decided agglutinative action upon the diplococcus. All the cases recovered. Those of catarrhal bronchitis were so slight that ordinarily they would have been unobserved. The authors **believe that pneumococcic septicemia is extremely common** in the various conditions that are produced by the pneumococcus. [One of us has recently observed 2 cases of typhoid fever with no signs of pneumonia, in which pneumococci were isolated from the blood; this was during a small hospital epidemic of pneumonia. Our knowledge of the occurrence of bacteria in the blood is likely to be radically revised; blood-cultures have already caused some revision.]

N. Raw² reports a case of severe pneumococcic infection that came on with an **acute glossitis**, which was followed by an arthritis of the temporomaxillary joint, severe infection of the lungs, and double empyema. In spite of this severe infection and grave course, the patient was improving at the time the case was reported.

J. B. Herrick³ discusses **pneumococcic arthritis** and reports 3 cases, 2 of which ended in recovery and 1 of which was fatal. Of the 2 patients who recovered, 1 had a functionally good joint. The other had arthritis

¹ Gaz. degli Osped., 1903, No. 2.

² Practitioner, April, 1903.

³ Am. Jour. Med. Sci., July, 1902.

of 2 joints, one joint recovering entirely and the other remaining somewhat stiff. The author also mentions 2 cases that he has seen, which he feels convinced were pneumococcic arthritis. The prognosis of the condition is necessarily grave, the mortality of the reported cases being over 65 %. One striking characteristic of the condition is that it tends to occur after the crisis, a fact that corresponds with experimental work on the question. It occurs more frequently in men than in women, and at any period of life. Arthritis may be the primary evidence of pneumococcic infection; previous damage of the joint by disease or by trauma favors the localization. The lesion may be confined to the synovia, or may involve the periarticular structures and the cartilages and bones. The affection is usually monarticular. Symptomatically, it exhibits the ordinary signs of arthritis. When suppurative, it should be treated by immediate incision and drainage. Serous arthritis should be managed by aspiration, rest, and compression.

R. M. Slaughter¹ reports a case of pneumococcic arthritis, and adds other cases not referred to by those that have recently collected cases from literature. This makes the total 68. This case was interesting on account of the fact that pneumococcic arthritis occurred in a joint in which an incipient tuberculosis was apparently developing. The joint suppurred; and, after draining the abscess-cavity and a sinus that formed, it was determined to amputate. After a prolonged and very grave illness, the boy gradually recovered. The examination of the joint showed that tuberculosis was present. This is apparently the only case on record in which pneumococcic arthritis attacked a tuberculous joint. The author considers that in pneumococcic inflammation of large cavities, when the pus has escaped from the joint and sinuses have formed, the safest procedure is amputation.

Omizzolo² reports a case of pneumococcic septicemia in which examination of the blood, as well as of the exudate of a joint-inflammation, showed the presence of diplococci. The patient was taken sick with fever, angina, polyarthritis, and abdominal symptoms suggesting typhoid fever; and had acute dilation of the heart, probably with septic myocarditis, and finally gangrene of the lung. The joint-symptoms were so pronounced that the case belongs most properly in the class of pneumococcic arthritis. The blood-serum actively agglutinated the diplococcus. The author refers to the gravity of cases of pneumococcic arthritis; including his own case, the mortality up to the present time has been 75 %. When the arthritis is multiple, it may resemble acute rheumatism; but it may be distinguished from that condition by its association with pneumonia, with pseudomembranous or phlegmonous angina; by the sudden onset of extremely grave general symptoms, entirely out of proportion to the temperature and the articular manifestations; and by the fact that salicylate treatment is useless, and that bacteriologic examination of the blood shows pneumococci.

F. de Quervain³ discusses pneumococcic peritonitis. French

¹ Amer. Med., April 18, 1903.

² Morgagni, Nov., 1902.

³ Correspondenzbl. f. Schweiz. Aerzte, No. 15, 1902.

authors have described this as a distinct clinical picture, occurring chiefly in female children, and distinguishable from pneumococcic appendicitis. The author describes 2 cases, in one of which pneumococci were found in the appendix, which was extirpated some weeks after opening an abscess in the region of the appendix. His cases and an examination of literature lead him to the positive belief that so-called pneumococcic peritonitis is really pneumococcic appendicitis. The pneumococcus can reach the appendix, not only through the circulation, but also by penetrating the intestinal wall. Pneumococcic peritonitis may, however, be due to diseases of the female genitalia, and secondary to other primary conditions than appendicitis.

RHEUMATISM.

Etiology.—F. J. Poynton and A. Paine,¹ in reporting briefly some further investigations concerning the cause of arthritis, state that they have learned that the microorganisms that they have previously described gain access to the synovial membrane by means of the blood-stream, and make their way out of the blood-capillaries that lie in the areolar tissue immediately under the endothelium of the synovial cavity. The endothelium prevents their entrance into the cavity. A large number of leukocytes are found in this areolar tissue after the local infection has occurred. The microorganisms cause distention of the blood-vessels. These sometimes rupture. The connective tissues swell, and there is exudation into the joint. The authors insist that the escape of the microorganisms into the joint-cavity is a vital and not a passive process. It is, therefore, a difficult process, and the microorganism may not succeed in it. As a rule, the joint-changes go no further than those mentioned; but if the cavity is invaded, the condition becomes much more severe. In less acute cases of rheumatic arthritis there is at first a cellular exudation about the capillaries and arterioles and later a perivascular fibrosis. The fibrous tissue contracts and thereby diminishes the blood-supply and the nutrition of the synovial tissues. As the result of this there is feeble circulation in such joints, and the effusion acquires dropsical characteristics. The progress of the disease is very slow, and the disease reacts imperfectly to treatment. In such cases the first stage of the disease only is due to bacteria. After this the symptoms are due to the perivascular fibrosis. The authors note that rheumatoid and rheumatic arthritis approach each other closely. In one case of Still's type of arthritis of childhood, they made bacteriologic investigations with negative results. They refer to the fact that they produced lesions of rheumatoid arthritis in rabbits by the intravenous inoculation of a diplococcus. This, they consider, shows that rheumatoid arthritis may be produced by an organism injected into the blood-stream, and not directly into a joint. They think that it is not improbable that some cases of rheumatoid arthritis associated with rheumatic fever are examples of intensification of bacterial virulence. They

¹ Brit. Med. Jour., Nov. 1, 1902.

refer to the importance of bacteriologic investigations of the exudation in joints, in order, for instance, to determine whether surgical treatment shall be undertaken.

E. W. A. Walker¹ discusses the micrococcus of acute rheumatism. He reports the results obtained by himself and Beaton in 15 cases of rheumatism in which the **micrococcus described by Poynton and Paine** was obtained. **Eight of these were acute rheumatism; 3, chorea; and 4, malignant endocarditis** in rheumatic subjects. The cultures were obtained from the blood, during life or at autopsy; from the urine; or, in 3 instances, from an articular exudate obtained during life. In the majority of cases the authors obtained pure cultures of the micrococcus. Intravenous inoculation into rabbits was carried out. The results were acute septicemia, pericarditis, endocarditis with beady vegetations, pleurisy, and monarthritis or polyarthritis. Repeated attacks of polyarthritis were produced in the same animal by repeated inoculations of the micrococcus. The organism was obtained from the blood and the urine, and from the lesions in the infected animals. The authors have not, as yet, produced fungating endocarditis. Walker believes that the organism is indistinguishable, by the usual methods, from an ordinary streptococcus; and thinks that the term diplococcus is misleading, as the organism **often does not present the appearance of a diplococcus**. The joint-exudation in infected animals varies from a clear fluid, through turbidity, up to definite purulence, the same organism sometimes producing pus and sometimes clear fluid. The author believes that the question of suppuration has little bearing upon the specificity of the infective agent, but he thinks that the organism is specific. He has used Marmorek's method of growing the organism in the filtrate from a streptococcus culture, to test its specificity. He found that in 2 cultures it grew abundantly, and thinks that this is **evidence of its specificity**. He recognizes the importance of the tonsil as a point of entrance, but considers that the pulmonary area is also probably important.

C. Philipp² has investigated 31 cases of rheumatism, 24 being typical acute rheumatism, from the standpoint of etiology. In 21 cases he examined the blood; and in 6, the fluid from the joints. His conclusions are that **no microorganisms can be found in the circulating blood** by the methods now in use. The same is true of the joint-fluid also. The blood and the joint-fluid were free from any substance causing similar symptoms in guineapigs, rabbits, dogs, or apes. Some **suggestive results were obtained with a calf**, however; and the author believes that this animal may be susceptible to the cause of acute rheumatism. He thinks that this point should be further studied. He considers the disease to be a **morbus sui generis**, of unknown etiology.

F. Meyer³ gives a discussion of his work on the bacteriology of acute articular rheumatism, which included investigations of 25 cases of sore-throat accompanying polyarthritis and 1 case of rheumatic verrucose endocarditis; and a discussion of his results from cultures and animal

¹ Practitioner, Feb., 1903. ² Deut. Arch. f. klin. Med., Bd. lxxvi, Hefte 1-3.

³ Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

inoculations. The conclusions that he reaches are, chiefly, that rheumatism is a **streptococcic infection of a peculiar variety**; that this special variety of streptococcus has rarely any tendency to show marked virulence; and that this explains the clinical course of rheumatism and its striking difference from pyemia, and also many other facts about rheumatism. He likewise thinks it possible, with the bacteria isolated, to produce in animals a disease affecting especially those organs which, in the human clinical picture, are chiefly involved; that a disease-process which, clinically and anatomically, is similar to rheumatism in human beings is set up by these bacteria; and that, with our present methods of investigation, these bacteria later become undemonstrable in the tissues.

Symptomatology and Complications.—J. J. Walsh,¹ in discussing **obstinate subacute rheumatism**, insists upon the varied character of joint-conditions, particularly the subacute and chronic diseases of joints; and upon the difficulty in distinguishing true rheumatism from other conditions. The obstinacy of many cases to treatment with salicylates is explainable upon very different grounds. It is sometimes dependent upon neurotic states. It occurs in alcoholics, in those with lead-poisoning, in anemic patients, and in those with blood-dyscrasias; and the joint-conditions that occur after influenza, dysentery, and the like, are not subject to ready relief from the use of salicylates. When joint-conditions do not readily respond to salicylates, they are usually not simple rheumatic arthritis.

E. R. Moras² claims that when a joint is involved by articular rheumatism, it **acquires some immunity** against further attacks; and that if further attacks occur, they involve other joints than that first affected. [This view is not well supported by extensive experience.]

W. Allen and J. W. Russell³ report a case of **rheumatic hyperpyrexia** in which the temperature was said to have **reached above 115° F.** at one time and over 110° at another, and was repeatedly above 107°; yet the patient recovered. Convulsions occurred. After the patient regained consciousness he was found to have lost articulate speech. During convalescence he had extreme ataxia of the legs. There was some incoordination of the upper extremities also. The original attack was in 1898. In 1900 the patient was able to walk, but only with great difficulty. He still had marked ataxia, slight Romberg's sign, and some difficulty in writing. There was no nystagmus and no tremor of the tongue. There was a curious tremor of the extremities upon volitional movement. There was a slight tendency to rigidity. The sphincters were undisturbed. Speech was slow, monotonous, and scanning; and somewhat blurred. Sensation was undisturbed. The reflexes varied. There was no muscular wasting. The optical conditions were normal, and the mental faculties unimpaired. In 1902 the condition was slightly improved. One similar case with **symptoms resembling disseminated sclerosis** after rheumatic hyperpyrexia, which was found in literature, is mentioned.

F. Nicholson⁴ reports a case that he believes to have been **spinal**

¹ Amer. Med., March 14, 1903.

³ Lancet, July 19, 1902.

² Amer. Med., Aug. 30, 1902.

⁴ Lancet, April 11, 1903.

rheumatism in a man of 33 years, whose first symptom was sudden weakness in the left arm without pain. This was followed within 12 hours by a similar condition in the right arm. After another 12 hours the right leg, and the next morning the left leg, became powerless. There was pain only on motion. There were no chills, but the temperature was elevated. The bladder and the rectum were not involved. The splenic area of dulness seemed a little increased. There was no evidence of involvement of the cranial nerves, and the reflexes were not much altered. The muscles became rigid. The patient improved somewhat after a time. For a time he was delirious; and at one time he had some swelling of the knee-joint, not much influenced by the use of salicylates. There was not much muscular wasting. The paralysis had decidedly improved at the time of the patient's death; but he had more pain, and the knee-jerks had disappeared. There had been some evidence of endocarditis, and the autopsy showed recent endocarditis and also chronic endocardial disease. The brain was normal. The spinal cord was not examined.

A. Janot¹ contributes a general discussion of **myocarditis in acute rheumatism**. Myocarditis is more likely to occur in young subjects and after repeated attacks or during severe ones. Previous disease of the heart also furthers its occurrence. Histologic investigation alone will determine its presence. It is usually associated with lesions of the myocardium, and even more frequently with disease of the pericardium. The microscopic changes are described. The symptoms are not well marked. They usually consist chiefly in a decided and rapid increase in the heart dulness, a decrease in the force of the apex-beat, murmurs, or gallop rhythm. Dyspnea, cyanosis, and precordial pain are important signs. If, in rheumatism, the infection and the heart weakness are marked, one should suspect myocarditis. Recovery often occurs, but death frequently occurs soon. Progressive asystole at times causes death. The development of signs of myocarditis renders the prognosis of articular rheumatism very serious. The **signs themselves are often greatly masked** by the presence of other forms of heart-disease or by functional disturbances of the heart.

Treatment.—Menzer² discusses the **serum-treatment of acute and chronic rheumatism**. He prepared a serum by Tavel's method. He also isolated streptococci from the tonsils of rheumatic subjects, and used large amounts of cultures from these streptococci to immunize large animals. This serum was then tested with animals and found to be harmless, and it was afterward **employed in more than 30 cases** of rheumatism. The author expected that if the serum was active, it would cause febrile reaction and would exercise its effect by stimulating the organism to produce a greater amount of antitoxin. He gives a series of temperature-charts from the cases treated, which show reaction after the use of the serum; and he also discusses its use in cases of chronic rheumatism. He likewise employed the serum in other streptococcal infections of the respiratory passages. As conclusions, he gives the following: The infections as a rule, cause no pain and no other local reaction.

¹ Thèse de Paris, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

When there is a local reaction, it is slight. A **general reaction usually occurs**, consisting in chilliness, fever, and the other signs common in general reactions, skin-eruptions being very frequent. The dose cannot, as yet, be definitely regulated. Menzer used 100 cc. to 150 cc., or even more, at first; later, 50 cc. to 75 cc., as the serum had become more active. He believes that in acute cases the **disease ran a shorter course**; and he particularly insists that the treatment seemed definitely to **prevent the occurrence of severe endocarditis**, as but one of the cases showed persistent signs of endocarditis when discharged, and this patient had had it when admitted to the wards. The chronic cases reacted to the injections by acute symptoms and were, he believes, very much improved by the injections. The author considers that his results in other cases of streptococcus infection were good, and that this indicates that rheumatism is **not an infection with a specific organism**.

Menzer¹ also demonstrated to the Berlin Medical Society a case of chronic articular rheumatism in which all forms of treatment had been used without success for 6 months. He then instituted treatment with Aronsohn's antistreptococcal serum, without effect; and afterward used his own serum. The effect of the latter was to produce a marked reaction with pain in the joints. Improvement followed, and 4 weeks later the patient was able to go about on crutches. When exhibited, he was practically cured.

Machtzum² discusses the treatment of chronic rheumatism as carried out in the Hydrotherapeutic Institution in Berlin. Either **dry or moist heat** is applied locally or generally, for as long as it can be borne, and at as high a temperature as possible, in order to produce a marked hyperemia. Following this, in order to harden the patient and to produce contraction of the relaxed tissues, **cold** is used. This is followed by **massage**, for the purpose of getting rid of substances that have become dissolved in the body-fluids in the course of the congestion produced by the heat. **Active and passive movements** are also employed, according to the indications. The most satisfactory method of applying heat the author believes to be the **steam stream**, which is used for about 10 minutes. Electric lamps are also used, but with less satisfaction. Massage causes less pain after the steam stream than after any other method of applying heat. In private practice hot moist applications, sand packs, and the like, are the most easily and most satisfactorily applied. If two or more extremities are involved, a full bath is often better than local applications.

C. E. Skinner³ discusses at some length **hot air as a therapeutic agent**; and, among other points, stated that it causes a marked hyperleukocytosis with a marked increase in the number of red cells. It increases the quantity of urine very largely, and also the amount of urea excreted. It likewise produces hyperhidrosis and accelerates the pulse, and it usually increases the strength and volume of the pulse and the rapidity and depth of the respirations. The author recommends the treatment in a large variety of conditions, mentioning first rheumatism and arthritis deformans.

¹ Zent. f. innere Med., 1903, p. 410.

² Therap. d. Gegenwart, No. 6, 1902.

³ Boston M. and S. Jour., April 9, 1903.

VARIOLA.

Etiology.—W. T. Councilman, G. B. Magrath, and W. R. Brinckerhoff,¹ in a preliminary report of their **studies on the etiology of variola**, describe their investigations concerning the cell-inclusions that are seen in this disease. Their especial point is that they believe that they have demonstrated that these cell-inclusions, which they consider to be living parasites, go through **one life-cycle only in vaccinia**; but that **in variola they have two life-cycles**. The authors think that the distinctions between the two diseases are due to this fact. The **two cycles are intracellular and intranuclear**, the latter being peculiar to smallpox. In the former cycle one finds in the lower layers of the epithelial cells of the skin, before anatomic evidences of vesicle-formation are observed, small, structureless bodies, 1 to 4 microns in diameter. The epithelial cells themselves do not appear degenerated at this time, the bodies mentioned lying in vacuoles in the cells. These bodies increase in size and present evidences of structure. The vacuole in which the body lies also enlarges, and forms a large central space around the nucleus. The body presents a somewhat ameboid appearance. A nucleus has not been definitely observed in any of these bodies. Segmentation ultimately takes place, producing small, round bodies, about one micron in diameter. Up to this time the nuclei show no noteworthy alterations. At the period of segmentation, most of the intracellular bodies disappear. Then small round or oval, ring-like bodies appear in the nucleus. These increase in size and acquire a definite structure, consisting in a series of vacuoles around a large central vacuole, the rim of the central vacuole staining very distinctly. There may be more than one such body in a single nucleus. Ultimately the nuclear rim grows less distinct and then disappears, and the body lies in a degenerated cell; or the cell breaks down and sets the body free. The final appearance of the structure of the body is that of many fine vacuoles with small circular bodies in it. These bodies have a central dot; they are extremely difficult to observe. The authors think it probable that the **intranuclear cycle is sexual in character**.

W. Dornbrowski² reports a series of studies of smallpox. An examination of the pustules in the earlier stages showed the constant presence of an **apparently pure culture of microorganisms** that, at this period, seemed to be all of a small, round, point-like appearance. They all showed very active motion. The second day the exudate contained numerous bodies 2 or 3 times as large as the others, which frequently showed a number of dark granules within them. At this period there were also white blood-corpuseles in the exudate. As the exudate became more purulent, it contained smaller numbers of the very fine, but more of the larger bodies. The latter are found chiefly within the leukocytes. The author believes that these organisms **develop purely by budding**. The contents of abscesses were investigated in 6 cases, and practically

¹ Jour. Med. Research, May, 1903; and Med. News, May 23, 1903.

² Zeit. f. klin. Med., Bd. xlvi, Heft 1-4.

the same results were obtained. In fresh blood-preparations the author constantly observed bodies that were exactly similar to the finest of the previously mentioned organisms, usually **free in the blood-current**. He has attempted to cultivate the contents of the pustules and abscesses, but has been unsuccessful in observing colonies. He found, however, that if the apparently sterile surface of the tube be scraped and the scraping be mixed with sterile water, numerous bodies similar to those previously mentioned as being present in the pustules can be detected; and they persist in the agar for months. Cultures from the blood in smallpox-cases show decolorization of the blood in the culture and a widening of the stroke; and these stroke-cultures contain the same bodies. The author believes that these bodies were not present accidentally, and considers that they **belong to the order of blastomycetes**. He thinks that they are probably pathogenic.

C. A. Hodgetts¹ discusses an epidemic of 1500 cases of smallpox that he observed. He notes the **hybrid character of the epidemic**. The disease occurred almost entirely among the unvaccinated. The contagiousness was apparently mild. The disease was often considered to be something else than smallpox; it was, nevertheless, undoubtedly that disease. Initial rashes were rare. The symptoms were mild and often decidedly uncharacteristic.

J. C. Hancock,² in discussing the recent epidemic of **smallpox in Dubuque**, Iowa, states that about 500 cases occurred. The mortality was about 1 %. In one instance a **baby was born with well-marked lesions** of the disease, the mother having the disease at that time. Both mother and child recovered. The author refers to the uncharacteristic appearance of the eruption in many cases, describing conditions similar to those mentioned by other authors. In 3 cases there was **marked lymphatic enlargement**, suggesting the necessity for operation, during the latter part of the pustular stage; but this swelling disappeared after a few days. In referring to the **Finsen-light treatment** of the disease, he states that, being unable to use the apparatus, he had the windows and transoms of several rooms covered with from 5 to 7 thicknesses of red paper. He believes that in the cases in which this modified Finsen method was used the results were better than in those in which it was not.

W. M. Welch and Jay F. Schamberg³ report their study concerning **nephritis in smallpox**, based upon an analysis of the urine in 128 cases, 1088 urinary examinations having been made. They conclude that **albuminuria is more common in smallpox than is generally believed**. It was **present in 65 %** of the cases examined. **Tube-casts were found in 45 %** of the cases; and the authors believe that in most cases albuminuria is the expression of a structural change in the kidney. Discrete variola and well-marked varioloid are almost as frequently accompanied with a nephritis as are cases with a more profuse eruption. This indicates that the **kidney involvement is probably the result of the**

¹ Canadian Jour. of M. and S., Oct., 1902.

² Medicine, Oct., 1902.

³ Phila. Med. Jour., Nov. 1, 1902.

specific smallpox poison rather than of the skin-lesions. It is necessary to make repeated examinations in order to avoid error, as the abnormal urinary constituents are not constantly present in individual cases. Microscopic examination should always be carried out, also, as **tubercasts were frequently found when albuminuria was not present** in easily recognizable amount. The nephritis is usually mild, and the symptoms are not obvious. The albumin may persist in the urine after convalescence, and this may be due to interstitial changes. It is quite possible that the nephritis of smallpox may produce chronic Bright's disease.

Prophylaxis.—Azel Ames¹ gives a description of the manner in which the **vaccination in Porto Rico** was carried out. In a general summary, he states that in October, 1898, smallpox was endemic in the island. It later became epidemic, and spread over the whole island. By February, 1899, there were 3000 recent cases. At that time systematic compulsory vaccination was undertaken, and was prosecuted vigorously for 4 months. In this time, 860,000 vaccinations were carried out; 87.5 % of these were successful. The disease had then practically disappeared; and in the two years and a half that have since elapsed, the **mortality has been but 2 per annum** from smallpox, while **previously it had averaged 621 per annum**. These figures are an absolute demonstration of the efficacy of vaccination. The great difficulty in obtaining vaccine and the energetic methods of producing it in Porto Rico are described.

W. M. Welch² reports a series of demonstrations of the **efficacy of recent vaccination**. He says that he has often seen a vaccinated infant nursed by its mother while the latter was suffering with smallpox, and yet the infant escaped the disease. He notes a case in which an infant was born while the mother had varioloid. Vaccination was done a few hours afterward, and again 2 days later, with a successful result; and the child escaped smallpox. He mentions a number of cases in which vaccinated children escaped, while unvaccinated children in the same family did not. He says that during the previous year 170 students were instructed in contagious diseases at the Philadelphia Municipal Hospital, and all saw smallpox. They had all been recently vaccinated, and not one contracted the disease.

A. Maude,³ in discussing the **clinical aspects of revaccination**, refers to the **raspberry excrescence**, or raspberry pock. He considers that it affords no protection. As to the character of the pock in revaccination, he believes that it is as perfect as after the primary insertion, in many cases. The constitutional symptoms are always more severe than they are in babies; and it is often difficult to make a diagnosis between these constitutional symptoms and influenza, when an epidemic of the latter is present. There **may be marked leukocytosis**, however. In referring to the rashes following vaccination, he says that they are, in general, of no consequence, except for the temporary irritation that they produce. Urticaria is most common in adults, but is mild and transient.

¹ Pacific Med. Jour., Sept., 1902.

² Amer. Med., July 12, 1902.
³ Lancet, Nov. 1, 1902.

Psoriasis he has not observed. He has seen a **generalized vesicular rash** once in revaccination.

Treatment.—N. R. Finsen¹ refers to the results that have been obtained by various observers with the **red-light** treatment of smallpox. He insists that it is an extremely important method of treatment, and that any physician who does not make preparations to protect the patient from daylight as soon as the diagnosis of smallpox has been made should be considered as having committed a grave error. The room in which the patient lies should be thoroughly darkened, only a candle being used to give necessary light.

J. F. Meech² reports some cases of smallpox that he has treated by applying **pure carbolic acid** to the individual points of eruption, using the applications as early as possible after the vesicles had formed. He considers that the results in controlling the suppuration were satisfactory; and that when used early, this treatment prevents suppuration and consequent scarring.

R. S. Thomson and J. Brownlee³ have made a study of the effects upon smallpox of large doses of **serum** obtained from vaccinated calves. Thirteen cases were treated by this method, the average amount given being 30 ounces of serum. About 16 ounces was injected as soon as possible after admission. The results were practically negative, but the authors believe that a further study of the method should be undertaken. They think it possible that intravenous injections would have a better effect.

INFLUENZA.

F. B. Lund⁴ contributes a study of 11 acute and 18 chronic cases of influenza, as diagnosed by bacteriologic examination. He discusses the clinical features of acute and chronic influenza occurring sporadically, and states that of **100 cases of patients with cough he found influenza bacilli in 60.** In about half of the latter number he found a practically pure culture of influenza bacilli. He thinks that there is **no distinctive clinical characteristic of influenza**, except when an epidemic is present; and that examination of the sputum for the bacilli is the only certain method of making the diagnosis. The cough and the expectoration may, at times, last for months or years after an attack of influenza; though this is not usually the case. Many cases, however, that have generally been classed as chronic bronchitis are, he considers, chronic influenza. One is likely to mistake chronic influenza for pulmonary tuberculosis; and, at times, paroxysmal dyspnea may make the condition closely resemble asthma. [One hesitates to accept purely morphologic evidence when it indicates such extreme frequency of influenzal infection.]

J. W. Washbourne and J. W. H. Eyre,⁵ in making studies of bronchopneumonia, have found the influenza bacillus in some cases in which the disease had not been suspected to be present. They **examined the**

¹ Brit. Med. Jour., June 6, 1903.

² Lancet, Feb. 21, 1903.

³ Lancet, April 4, 1903.

⁴ Boston M. and S. Jour., Dec, 18, 1902.

⁵ Brit. Med. Jour., Dec. 20, 1902.

lungs in 12 cases, in 4 of which they isolated and identified Bacillus influenzae. In four other cases they found bacilli morphologically identical with the influenza bacillus and resembling that organism in the cultures obtained, but the identification was not positively carried out.

B. W. Sippy,¹ in discussing the diagnosis of influenza, states that the only positive method is to demonstrate the influenza bacillus in the secretions or the exudates of the case. Next to this, the most important point is the presence of an epidemic; but there are some other signs that are suggestive. Among these are **violent paroxysms of cough, marked dyspnea**, without physical signs sufficient to explain it, and an **excessive amount of sputum.**

H. S. Anders,² after a study of the atmospheric pressure in its relation to epidemic influenza in Philadelphia, concludes that the behavior of the atmospheric pressure in relation to influenza is characterized by a **marked lack of equability.** The absolute daily, sometimes almost hourly, extremes cannot be determined by a study of monthly or yearly averages or of means.

Ghon³ contributes a study of 2 cases of **influenzal meningitis**, with a collection of the cases in the literature—12 in all, including his own. Of these, 8 were in children. The first of Ghon's cases occurred in a man of 33, the infection taking place from the frontal sinus. The second case occurred in a nursing child, 8 months old, and was a metastatic infection. In the first case, in spite of the fact that numerous influenza bacilli were present in the meningeal exudate, the cultures did not demonstrate them. In the second case they were obtained by **culture from the fluid yielded by lumbar puncture.**

SPOTTED FEVER OF THE ROCKY MOUNTAINS.

L. B. Wilson and W. M. Chowning⁴ present a preliminary report of their studies of the so-called spotted fever of the Rocky Mountains. This disease is observed chiefly in Idaho and Montana, and has been known for about 30 years. Probably as many as 200 cases of the severe type have occurred in this time, **70 % or 80 % of which were fatal.** The disease appears only in the spring. There is another type that is very mild and is difficult to diagnosticate. The severe, fatal form has as its **chief characteristic the spots.** It has usually an onset with chill, and chills occur subsequently. There are severe bone and muscle pains, marked prostration, restlessness, and bronchial cough; and the whole appearance soon becomes markedly typhoidal. The temperature is likely to be high in the beginning and to become increasingly high, **hyperpyrexia frequently occurring.** The fever remains high for about two weeks; then, if recovery takes place, it gradually declines, reaching normal in another fortnight. The eruption occurs from 2 to 5 days after the chill, first about the ankles or back, and then gradually extending

¹ Chicago Med. Recorder, May, 1903. ² Phila. Med. Jour., Jan. 24, 1903.

³ Wien. klin. Woch., Nos. 26 and 27, 1902.

⁴ Jour. Am. Med. Assoc., July 19, 1902.

over the entire body—sometimes rapidly, and sometimes only after 2 days or more have passed. It involves the scalp, the palms, and the soles; and it may be seen in the mucous membrane of the cheeks. The spots are at first rose-colored, circular, 1 to 5 mm. in diameter, not elevated, and disappearing on pressure. They are sometimes tender. They usually change rapidly, and then do not disappear on pressure, but exhibit a dark-blue or purplish color. They sometimes give a marbled appearance to the entire body, through confluence. When not confluent, there is a speckled appearance over the body. There is usually some jaundice, and there is desquamation in the third week. Gangrene of the skin has been observed. There is an ashy paleness toward the end in the grave cases. There may be no severe nervous symptoms, but delirium is common. Evidences of meningitis are not present. The blood shows reduction in the hemoglobin. There is no Widal reaction. The respirations are rather markedly increased, and sometimes extremely so. The complications of the disease are gangrene, hypostatic pneumonia, articular rheumatism, and some other conditions. As a rule, the patients recover, if taken to the lower valleys; but the **disease is at times very malignant**. It is possible that the mild type is not the same condition as what is called the severe type of the disease. When the eruption occurs, the mortality is very high. Autopsy shows an enlarged spleen and scattered hemorrhages. The meninges of the brain and cord show nothing but hypostatic congestion. The etiology of the condition was carefully studied, and while no bacteria of etiologic significance were found, the authors did **find protozoa in the freshly drawn blood**. These organisms varied greatly in size, form, and staining reactions at the various stages of the disease, and apparently presented different phases of the life-cycle of the parasite. The smaller form closely **resembles the parasite of Texas fever**. Injections into rabbits were followed by marked febrile symptoms, but not by death; injections into pigeons were apparently negative. There is no evidence that spotted fever has ever been transferred directly from man to man. It is **possible that it is carried by ticks**. This cannot be proved, but the circumstantial evidence of it is good.

YELLOW FEVER.

E. Souchon¹ thinks that the eradication of yellow fever in Havana was not due solely to the elimination of the infecting agency of the mosquito. He thinks that this has tended to exhaust the infection, but believes that the present exemption of the city from the disease is really due to the establishment of **proper quarantine regulations**. He says that there are other means than mosquitos for the transmission of the disease.

E. Souchon² also refers to the cases of yellow fever noted on the vessels arriving at the Mississippi River Quarantine Station during the 15 years between 1886 and 1891. He believes that the figures that he

¹ Med. Rec., Oct. 25, 1902.

² Med. Rec., Aug. 16, 1902.

presents indicate that mosquitos had very little to do with the development of yellow fever, and thinks that this fact is a further indication that fomites are active in transmitting the disease. [It is, with our present knowledge, fruitless to oppose the view of the almost supreme importance of the mosquito in transmitting yellow fever.]

PLAGUE.

G. J. Blackmore¹ reports some interesting notes on the outbreak of plague in Port Elizabeth in 1901, demonstrating the close relationship of plague in rats with the outbreak of the disease in human subjects. He analyzes 33 detailed cases, and shows that the first occurred after dead rats had been found in the cargo discharged from a ship that had come from an infected region. In the subsequent cases it was noted that the relatives of the patients did not contract the disease; "contacts," also, did not contract it, nor did neighbors. The dwelling-houses of the patients were widely separated, but practically all the patients worked in an area that was proved by bacteriologic examination to contain infected rats. So long as dead rats were found, cases of plague continued to be observed in this region. When the dead rats ceased to be found, plague no longer appeared in this portion of the town, but followed the course of the infected rats along a narrow strip of land; infected rats and plague cases turning up coincidentally in various regions, somewhat distant from the original point. None of these patients were known to have come into actual contact with the rats, and the evidence was good that they had been infected by some intermediary—most probably, of course, the flea. Flea-bites occur much more frequently on the legs than on other parts of the body; this probably explains the common appearance of the disease as femoral buboes.

G. F. Lydston,² in some studies on plague as observed in Sydney, New South Wales, states that the epidemic there afforded clear evidence of the fact that plague is not "catching," in the usual sense. He believes that the Yersin-Roux serum is of doubtful value as a specific, but that it is an undoubted stimulant. He considers the value of the Haffkine serum to be questionable. No physicians or attendants in Sydney acquired the disease. The infection was apparently due, in the beginning, to rats. The author suggests that cats and other domestic animals may be dangerous sources of infection, chiefly through the fleas that infest them.

C. B. Ewing³ has made a series of studies of smear-preparations and cultures from the blood of about 50 plague-patients. He found Bacillus pestis in only about 3 % of the cases (apparently in smears); but cultures showed it in about 30 cases, when mere staining did not. Just before death, it was found in about 90 % of the cases; and after death, in each of 20 cases. It was easy to detect the bacilli in incised buboes, though in suppurating buboes it frequently could not be found

¹ Lancet, Oct. 11, 1902.

² Chicago Med. Recorder, Feb. 15, 1903.

³ Med. Rec., April 4, 1903.

after a few days. A leukocytosis of from 8000 to 50,000 was observed in all the 50 cases. The author notes one case of **cutaneous plague**, the chief lesions being pustules in the lumbar region. The patient recovered. He also notes 2 cases in which the portal of infection could not be determined. He did not find the examination of the blood to be of especial diagnostic value.

Treatment.—R. W. Hornibrook,¹ in discussing the use of **Haffkine's prophylactic**, refers to the figures obtained in the town of Dharwar in 1899. In 17,604 inoculated persons there occurred 141 attacks and 55 deaths among the once inoculated, and 41 attacks and 21 deaths among the twice inoculated; while among the uninoculated, who were less in number than the inoculated, there were 1187 attacks and 927 deaths. Of the hospital staff of 32, about one-half were inoculated. Of these, none contracted the disease. Among the uninoculated, 6 contracted the disease, and all of these died. The author **strongly recommends the use of the prophylactic** when one is to be exposed to plague. He insists that the use of inoculation during the incubation period or during the actual period of onset of the disease does not increase the danger from the disease, but rather seems to decrease it. He was convinced of this by experience, having previously held the contrary theoretic view. He **recommends double inoculation**. He thinks the period of protection lasts 6 months, and perhaps a year. The fluid may be kept as long as 12 months without deteriorating, and perhaps longer.

D. L. Cairns² discusses the treatment of bubonic plague with **Yersin's serum** and the mode of action of this serum. He decides that it is a remedy of great value in the treatment of plague; that its **action is bactericidal**, as may be demonstrated by finding **degeneration in the bacilli**; that it also has an antitoxic action; and that this double action is best secured by administering the serum early and in large doses—**both subcutaneously** in the lymphatic area that drains toward the buboe, **and intravenously**. In mild cases subcutaneous injection alone will probably suffice; in severe cases the combined method should be used, and from 150 cc. to 300 cc. should be administered as the initial dose.

W. J. Calvert³ reports 3 cases of plague that occurred in Manila. These were treated with serum, Yersin's serum being used in the first case and Kitasato's in the others. In the second case the **serum is thought to have done good**. The author believes that large amounts must be used, if good results are to be obtained.

A. Gautier⁴ has made a study of the **effect of arrhenal** upon various infections, including plague. He was led to make these investigations by a knowledge of the influence that experimental work has shown arsenic to produce upon the leukocytes. He could not find that arrhenal had any influence upon animals infected with plague.

¹ Australasian Med. Gaz., Dec. 20, 1902.

² Lancet, May 9, 1903.

³ Boston M. and S. Jour., Jan. 8, 1903.

⁴ Bull. de l'Acad. de Méd., Dec. 9, 1902.

CHOLERA.

A. MacKaig¹ refers to the **relation between insects and cholera**, and discusses the extremely virulent epidemic that broke out in a colony of 13,000 or 14,000 persons during a famine. He believes that his observations indicate that the use of certain foods was responsible, and he thinks that these foods were infected through the numerous insects that were present.

L. Rogers,² in discussing **blood-examinations in cholera**, states that there does not seem to be any constant relationship between the degree of concentration of the blood, as indicated by the number of red corpuscles, and the death-rate. He considers a **high degree of leukocytosis a bad prognostic sign**, and a slight degree as a good one; yet cases with very high leukocytosis may recover. In some observations on the blood in plague, he found an unusually large proportion of lymphocytes. In cholera, he found the **percentage of polymorphonuclear cells high**, and the lymphocytes rather decreased. The large mononuclear cells are usually increased above the normal, both relatively and absolutely; they generally outnumber the leukocytes about 2 to 1. This the author considers to be an **important diagnostic sign**. In a series of 6 cases of noncholeraic diarrhea he found an absence of this condition. He believes that this method of blood-examination, because it is much more rapid than the bacteriologic method, may prove to be of much importance. He finds a definite relationship between the number of large mononuclear cells and the severity of the disease. He thinks this indicates that **this change is specific**.

M. A. Ruffer and C. Z. Bey³ state that as the result of the precautions adopted in 1902 at the port of Tor, there was **no spread of cholera in the quarantine camps**, in spite of the arrival of a large number of ships infected with cholera. They also say that flies were present in enormous numbers at this time; they are therefore **skeptical as to the supposed role of these insects** in the transmission of the disease.

W. C. Mabry and H. C. Gemmill⁴ discuss an epidemic of cholera that occurred on the U. S. army transport "Sheridan," while en route from Manila to Japan. They particularly refer to the **antitoxin and the vaccine that are being used by the Japanese** in treating this disease. They state that Kikuchi, the chief quarantine officer at Nagasaki, informed them that in approximately 700 cases of cholera in the region of Nagasaki, the mortality had been 35 %; and that the mortality in those treated early with the antitoxin had been small. Kikuchi believed that **any case not in extremis would recover** if the antitoxin was properly administered. The vaccine has been used in protecting all the doctors, nurses, and attendants at the station, and no case of cholera has occurred among them. In a village in which inoculations were performed some cases of the disease occurred among the inoculated on the first day of

¹ Edinb. Med. Jour., Aug., 1902.

³ Brit. Med. Jour., July 12, 1902.

² Lancet, Sept. 6, 1902.

⁴ Jour. Am. Med. Assoc., Dec. 20, 1902.

observation. After that, **none of the inoculated acquired the disease**; while the infection spread freely and was very fatal among those not inoculated. Moore and Gemmill used the antitoxin in 8 of their cases. Half of these died, but all 4 had been gravely ill before being taken with cholera. Two of the 4 cases that recovered would, the authors believe, have died without the antitoxin. The other 2 cases were treated very early, and the disease was apparently aborted. In all the cases the injections produced marked amelioration of the symptoms. The authors also tried the vaccine on a series of persons; but, because of their small number of observations, they confine themselves chiefly to discussing the reactions produced by the injections.

MALTA FEVER.

C. F. Craig¹ discusses **Malta fever in the United States army** and reviews the literature concerning that disease. **Four cases were observed** in the Presidio at San Francisco between December 1, 1901, and March 24, 1902—2 of the cases during acute exacerbations of the disease, and 2 during the chronic stage. The diagnosis was made by the agglutination test with *Micrococcus melitensis*. In the two chronic cases the chief symptoms were suggestive of articular rheumatism, and would have been diagnosed as such, had it not been for the agglutination reaction. The reactions in these cases were obtained at dilutions of 1 : 100. The method of performing the agglutination test was practically that used in making the Widal test with dried blood. These cases had apparently **acquired the disease in the Philippines**. The author considers that there is a disease occurring in the tropics or subtropics that in its acute stage resembles either typhoid fever or malaria, and in its chronic stage resembles articular rheumatism, and is caused by the *Micrococcus melitensis*. There are no pathognomonic symptoms of Malta fever, the symptoms being inconstant and confusing. The diagnosis of this condition is practically impossible without the aid of the microscope and of the serum-test.

Hislop² directs attention to the fact that it is now recognized that **Malta fever is not limited to the Island of Malta** and certain regions along the coast of the Mediterranean, but that it appears in various portions of the tropics and is **particularly common in India**. He insists that the general statement that enlargement of the spleen indicates malaria and contraindicates Malta fever is incorrect. He has frequently observed marked enlargement of the spleen in Malta fever, the spleen, in some cases, reaching to the middle line of the abdomen and into the hypogastric region. If the spleen is found enlarged and energetic treatment with quinin does not control the fever, one should suspect Malta fever.

¹ Am. Jour. Med. Sci., Jan., 1903.

² Brit. Med. Jour., Sept. 20, 1902.

DENGUE.

W. G. Pridmore¹ states that an epidemic of dengue occurred in Burmah in the spring of 1902. All nationalities were attacked. He considers that the disease is undoubtedly highly infectious and **may be carried by a third person**, his own child having acquired it a week after he himself saw the first case in that region. The child had not been exposed to direct infection in any way, and Pridmore did not have the disease at that time. He believes that the **incubation-period is from 1 to 3 days**. The symptoms of onset were characteristic, and were similar in the different cases. He found **general enlargement of the glands** in at least 75 % of the cases. Joint pains were observed in some instances. No case of which he had knowledge ended fatally. He believes that the patients should be segregated and that care should be used in their quarantining. In 2 instances he feels confident that the **doctor carried the disease**.

F. M. T. Skae² refers to dengue fever in Penang, where an epidemic occurred in the spring of 1902. The disease **differed considerably in its characteristics from dengue as usually described**. The incubation-period seemed, as a rule, to be 1 or 2 days. Premonitory symptoms were often absent. The onset was sudden. Nervous symptoms were common in children. In the early part of the epidemic pain was usually absent; it was very marked in only one case. The **initial eruption was very slight** in most cases. In many cases the later rash did not appear. In a number of cases the author noted an eruption of **isolated grayish vesicles in the mouth**. This eruption was painful. Enlarged lymph-glands were seen in but 2 cases. The diagnosis was often difficult. In no case did Skae see a combination of rheumatoid pains, rash, and secondary fever.

LEPROSY.

T. J. Tonkin³ contributes an analysis of 220 cases of **Sudanese leprosy**. Over 86 % of the cases presented patches only. There were a few more males than females. A striking fact was that 25 % of the cases had **appeared before the tenth year of life**, and that 38 % more had appeared before the twentieth year—contrary to the experience of many other observers. The author believes that there are **many instances of recovery from most grades of leprosy**. He insists that it is entirely incorrect to state that a person still has leprosy, when he merely has the deformities resulting from leprosy. Almost 90 % of the patients had been born of healthy parents, and the children of lepers born before the disease had appeared in their parents were themselves leprous in only about 7 % of instances. The children born after the disease had appeared in their parents were leprous in 12 % of the cases. Tonkin considers that there is **no evidence of the hereditary trans-**

¹ Brit. Med. Jour., Nov. 15, 1902.

² Brit. Med. Jour., Nov. 15, 1902.

³ Lancet, April 18, 1903.

mission of the disease, but thinks that its transmission is due chiefly to environment. The **reproductive functions were evidently poor**, as shown by the small number of births. There was no satisfactory evidence of a leprous taint in the earlier generations of the families; there was, however, evidence that leprosy had developed earlier in the persons brought up in surroundings in which leper-contact was a distinct possibility. This strongly favors the view that the **transmission is by direct contact**. The author believes that one of the most important means by which the disease is propagated is through the **improper diet** used by the Sudanese, the carbohydrates being largely in excess. By this he means merely that it is an unphysiologic diet and that it **tends to increase the susceptibility** to the disease. He also refers to his previous report concerning the bad hygienic practices of the Sudanese, especially the method in which unwashed clothes are handed about from person to person.

SLEEPING-SICKNESS.

A. Castellani¹ states that he has never been able to find any of the germs described by other workers on sleeping-sickness, but that he has found **an organism that he considers to be the cause of the disease**. He has grown it in 8 out of 10 postmortem examinations from the cerebrospinal fluid and from the blood of the heart, always in pure culture. He has found it but once in the blood during life, but has discovered it in 2 out of 3 cases in the cerebrospinal fluid removed by lumbar puncture. It is a **streptococcus**, and is, he thinks, a distinct variety of this organism. In a note, he states that he has, in all, grown the organism in 9 out of 11 postmortem examinations.

A. Bettencourt, A. Kopke, G. de Resende, and C. Mendes,² members of the Portuguese Commission investigating the etiology of sleeping-sickness, mention their previous results, which they believe to indicate that the disease is **anatomically a meningoencephalomyelitis**, and also refer to their previous discovery of a diplostreptococcus in the cerebrospinal fluid. They then refer to their communication at a public conference in Lisbon, in which they believe that they **demonstrated the existence of this organism in the blood** and spleen, and, particularly, in the nervous system, by means of cultures and sections. They believe that the streptococcus found by Castellani is not, as he thinks, different from theirs, but that it is the same organism. They criticize the supposed differences between the organisms, and conclude that his results confirm theirs.

A. Maxwell-Adams³ refers to the case of trypanosomiasis previously reported by Dutton (see under "Parasites"), which he had himself first observed. He mentions the puffiness of the eyelids, and the fact that this varied greatly from day to day. It was sometimes present on one side only, and sometimes on the other. The author suggests that the **infection might have been carried by rats** and inoculated through the

¹ Lancet, March 14, 1903.

² Brit. Med. Jour., April 18, 1903.

³ Brit. Med. Jour., March 28, 1903.

bites of these animals (see Manson, under "Parasites," on trypanosomiasis.) The disease is common in the rodents, and the patient had been bitten by them. The author also believes that the probability that the disease is conveyed by direct inoculation is an explanation of its infrequency in the human subject. He **thinks that this parasite may be the cause of sleeping-sickness**, and states that the natives with this disease rarely consult European physicians, as the native doctors have a method of cure that they consider superior to any other. It consists in **excising the enlargements at the angle of the jaw**, which are almost universal in the early stages. This procedure is said to be a certain cure when carried out very early.

A. Castellani¹ reported to the Royal Society that he had found a **trypanosome in the cerebrospinal fluid** removed from a case of sleeping-sickness during life by lumbar puncture. He stated that in order to observe those trypanosomes one should draw off at least 15 cc. of the cerebrospinal fluid, rejecting the first few cubic centimeters, as they are likely to be bloody. One should then centrifuge for 15 minutes, and examine the white sediment, pouring off the liquid above. The trypanosomes are at first fairly active and easily detected. Among 34 cases of sleeping-sickness, he **found them in 20 instances**; among 12 cases examined as controls, he did not find them in any instance. Three of these controls were cases of the usual trypanosoma fever. At post-mortem examination he found a streptococcus in 80 % of these cases. He is now inclined to believe that this **streptococcus is present merely through a secondary infection**. In a note, it is stated that Bruce, who continued these observations after the departure of Castellani, had cabled that in 38 further cases of sleeping-sickness he had found the trypanosome in the cerebrospinal fluid in every case, and had found it in the blood in 12 out of 13 cases.

Castellani² later gives a detailed **description of the trypanosome** that he has found in the cerebrospinal fluid of cases of sleeping-sickness. It has the outline common to the trypanosomes—a worm-like shape, with a flagellum at one end, being closed at the other end; there is an undulating membrane and a vacuole. The protoplasm has a rather alveolar structure. The parasite exhibits a screw-like motion, which gradually ceases. It often becomes enclosed by a leukocyte. Leishman's modification of Romanowsky's stain gives good results. The author thinks that he has observed developmental stages of the parasite, particularly in the last stages of sleeping-sickness. The parasite is very much like **Trypanosoma gambiense**, though it exhibits some slight differences, and may turn out to be a new species.

TYPHUS FEVER.

E. Gotschlich³ reports some observations regarding **protozoa (Apiosoma)** in the blood of typhus-fever patients. He draws no definite con-

¹ Brit. Med. Jour., May 23, 1903.

² Brit. Med. Jour., June 20, 1903.

³ Deut. med. Woch., May 7, 1903.

elusions as to the etiologic importance of these parasites, as he states that his observations have, as yet, been too few in number. The **parasite closely resembles that of Texas fever**. He **describes 3 forms**, the endoglobular variety and 2 extraglobular varieties. The latter are either cystic or ciliated. The former are most commonly of pear shape, but vary in their morphology. They show very active movement, and their size is usually between 1 micron and half the diameter of an erythrocyte. The ciliated extraglobular bodies resemble spermatozoa. The cystic forms vary from half the diameter of a red corpuscle to double that diameter. The **methods of staining** that best show these bodies are very dilute borax-methylene-blue for the endoglobular bodies, and for the extraglobular very brief staining in undiluted Ziehl's carbol-fuchsin, washing immediately afterward in water. The author has investigated only 6 cases for these parasites, and in only 1 has he been able to discover all 3 varieties in the blood. He believes that if this parasite or a similar one should be found to be the cause of typhus fever, this would explain many of the peculiar facts about the transmission of this disease, particularly the role of insects in its transmission. He considers it probable that **fleas are particularly important in transmitting it**, very likely through directly carrying the parasite from one person to another.

RABIES.

T. Kasperek and K. Teuner¹ report a case of hydrophobia that presented the **first symptom 7 months after the Pasteur treatment** had been carried out. The diagnosis was confirmed by animal inoculations. The disease was of the convulsive form. Four children had been bitten; but the other 3 still remained in normal condition 21 months after the opportunity for infection had occurred. It could not be determined which child had been bitten first.

Biala² reports that in 1901, **1321 persons were treated for rabies** in the Pasteur Institute at Paris. Eight died, and in 3 the disease broke out before the treatment was at an end. The general mortality was 0.38 %—a figure that closely corresponds with that obtained in the last 12 years. The persons treated were, in 123 instances, bitten about the head; in 800, about the hands; and in 393, elsewhere. All but 9 of the persons treated were French.

MISCELLANEOUS SEPTIC CONDITIONS.

Bertelsmann³ makes a very important contribution concerning the **bacteriologic investigations in the early stages of sepsis**, adding some new facts to those that he has already reported. He investigated all the cases of pyogenic infection that occurred in a year in the Hospital of St. George in Hamburg. The cases were 220 in number, and 154 were considered worthy of study. **Of these, 48 showed bacteria in the**

¹ Berl. klin. Woch., Sept. 8, 1902.

² Ann. de l'Inst. Pasteur, No. 6, 1902.

³ Deut. med. Woch., Feb. 5, 1903; Vereins-Beilage, p. 43.

circulating blood. This is an extremely large number, considering that these cases include not only those suspected of general sepsis, but also all cases of local pyogenic infection. In osteomyelitis, and particularly in cases of cellulitis, large numbers of bacteria were often found in the blood, 15 cc. being used in culture; **and yet surgical treatment of the primary focus caused the bacteria to disappear rapidly** and completely in many instances. Only 20 of the 48 positive cases ended fatally. A comparison of these figures with those of Lenhartz—in which, in 148 cases of sepsis, 143 died—indicates, to the author's mind, that Lenhartz investigated cases of actual outspoken sepsis, while those discussed by Bertelsmann are **most of them cases of beginning sepsis**, showing an infection of the blood, but not actual metastasis. He considers that in many local infections there is not only a toxinemia, but an actual invasion of the blood by bacteria; and the number of bacteria in the blood may be even greater than the number found in outspoken sepsis. At times, no results followed this invasion; at other times, because of the virulence of the infection or on account of the lack of resistance in the individual, the clinical picture of ordinary sepsis appeared. It is **possible that the living blood itself may become a nutritive medium** for bacteria; but there is, as yet, no demonstration that this is true. The bactericidal power of the blood is apparently sufficient to overcome invasion unless the bacteria localize themselves at some point in the tissues; so that the clinical picture of sepsis seems to mean that the bacteria have found some local point suited to their growth and development. How and where this occurs is not yet sufficiently explained; this view, however, indicates that there is **no essential difference between septicemia and pyemia.** The author found, in his surgical material, no instance that he thought could properly be called a thromboembolic pyemia, this being the true form of pyemia, as this word has been used. He believes, however, that such conditions do occur, particularly in relation with otitis. In his cases there were 28 instances of streptococcus infection, with 32 % mortality; 13 of infection by Staphylococcus aureus, with 70 % mortality; 2 of infection by Staphylococcus albus, with cure in both; 1 of pneumococcus infection, which was fatal; 1 of colon infection, in which recovery occurred; 1 of anthrax, which recovered; and 2 of mixed infection in urethral fever, one patient dying accidentally and the other of the infection. These results indicate that **staphylococcus infection is graver** than that with the streptococcus—a conclusion that is not in agreement with the views of other authors, with the exception of Lenhartz. All the infections with Staphylococcus aureus that were not due to osteomyelitis ended fatally. While the 20 cases of pyogenic infection that ended fatally all showed bacteria in the blood, in 14 cases of peritonitis of intestinal origin bacteria were never found. Bertelsmann thinks, therefore, that these cases are probably instances of toxinemia. He recommends the use of bacteriologic blood-examinations; but, as the result of his investigations, he considers that the **result of the cultures cannot be used as an absolute indication for or against operation.**

E. Libman¹ records a note on **general infection with Staphylococcus aureus**. He has, in all, the **records of 23 such cases** in which he found this organism in the blood during life; and this finding was confirmed in every instance. Of these patients, 5 recovered. In 330 other blood-cultures, he has never found a single colony of *Staphylococcus aureus*. He consequently believes that there is no doubt as to the validity of the findings in the 23 first-mentioned cases. He found that the **number of bacteria in the blood was not always proportionate to the gravity of the case**, but that it depended to some extent upon the time at which the examination was made.

F. Meyer² reports an investigation concerning **agglutination of streptococci**, in which he used streptococci from 10 different sources, including cases of sepsis, erysipelas, and other conditions entirely unassociated with pus-formation, such as scarlatina angina, simple follicular angina, angina with rheumatism, and serous pleurisy. He tested the various organisms with the serums of Marmorek, Tavel, and Aronson; and with his own serum, obtained from a rheumatism streptococcus. As an example of the results, he states that the streptococcus from the case of pleurisy was agglutinated by the serum from none of the other cases except that from a case of rheumatism. He insists that streptococci are actively agglutinated by specific serums, and that this agglutination becomes much more easily noted and much more active when the serum is very largely diluted (at least 1 : 25; better, still more). **Absolute differences between the pyogenic streptococci and those of angina and similar conditions** can be demonstrated by agglutination. There are also differences between the streptococci of scarlet fever, rheumatism, and simple angina; but these are slighter. The author considers that in preparing bactericidal serums for human therapy, bacteria that have been made more virulent by being passed through animals should not be used.

H. Schmidt³ gives a brief general discussion of the use of **intravenous injections of collargol in septic conditions**. With the new and improved preparation, he finds that it does not even produce a febrile reaction; and he considers it perfectly harmless. He makes use of solutions varying in strength from 2 % to 5 %. He injects varying amounts: sometimes the amount contained in a hypodermatic syringe; sometimes as much as 10 cc., depending upon the case. He repeats, if necessary, as often as every 12 hours. He finds that, as a rule, except when the patient is nearly moribund, improvement is seen almost at once. He contributes a series of cases demonstrating this improvement.

C. L. Klotz⁴ reports the case of a woman who was taken sick with a severe tonsillitis followed by pains in the limbs, and with the appearances of sepsis. When seen for the first time, about a month later, she looked extremely septic and had joint-pains. The heart was enlarged, and there was a systolic murmur. **Intravenous injections of Credé's silver** were given (from 7 to 9 cgm. in 1 % solution). After the

¹ Med. News, April 18, 1903.

² Deut. med. Woch., Oct. 16, 1902.

³ Deut. med. Woch., April 9, 1903.

⁴ Deut. med. Woch., July 17, 1902.

first injection the temperature fell; after the second it reached subnormal; and after the third it went below normal, never becoming febrile afterward. The patient recovered rapidly. [A somewhat doubtful fact is that the signs of cardiac involvement absolutely disappeared. We have used intravenous injections of collargol, however, in a number of cases of sepsis with results that were decidedly encouraging, though not conclusive. It is difficult to be sure of entering the vein, and failure is likely to cause severe local irritation.]

Salomon¹ reports an interesting case of **meningococcus septicemia** that occurred in a woman who had previously been healthy. She was suddenly taken with multiple joint-swellings associated with skin-eruption. The spleen was enlarged, and the temperature elevated. Albuminuria was present, and blood-cultures showed the meningococcus. Various drugs were used in an attempt to control the high intermittent fever and the skin-eruptions, but without effect. The patient suddenly developed hyperesthesia, epileptiform convulsions, severe headache, violent vomiting, rigidity of the neck, and facial palsy. Lumbar puncture brought forth 20 cc. of a cloudy fluid, which contained many meningococci. A subsequent puncture showed a less cloudy fluid that contained no meningococci. The patient was continuously delirious and had violent hallucinations. Some days later there was a renewed onset of violent cerebral symptoms, with severe epileptiform convulsions, after which the patient gradually improved, and was ultimately discharged as entirely cured.

M. Sachs² describes an interesting case of **general infection with Friedländer's bacillus**. The disease occurred in a man of 66 that had an organic heart-lesion. He suddenly became blue and gave constant cries, as if in terror. Because of the latter symptom he was admitted to the psychiatric clinic. He died the next day, and the postmortem examination showed old mitral disease, with acute endocarditis, fibropurulent meningitis, and multiple abscesses in the kidneys and in the prostate. The cultures from the various areas of suppuration, from the endocardium, and from the spleen showed a bacillus with the characteristics of Friedländer's, which was pathogenic for rabbits. This was also found in sections of the organs. It was always Gram-negative. The infection was believed to have taken place from the urethra. This shows that **Friedländer's bacillus may cause pyemic abscesses**.

R. I. Cole³ reports a case in which, after infection of the stumps of a man's crushed legs, **Bacillus aerogenes capsulatus** was isolated from the circulating blood. An autopsy could not be obtained. The case apparently demonstrates that this organism may be present in the blood, either without producing any gas or with the production of only an inconsiderable amount. [We have recently observed a case of malignant endocarditis in which *Bacillus aerogenes capsulatus* was twice recovered from the blood some time before death; in the first instance

¹ Berl. klin. Woch., 1902, No. 45.

² Zeit. f. Heilk., Bd. xxiii, Heft 10; Abth. f. path. A. u. v. D., Heft 4.

³ Johns Hopkins Hosp. Bull., Oct., 1902.

pure, in the second with the streptococcus. Both organisms were found at necropsy.]

G. Engelhardt and M. Löhlein¹ report a case of **streptothrix pyemia** that occurred in a young man who had for 9 months had signs of intestinal and liver disease, and who for 3 months before death had had marked weakness and fever. At the end there were septic symptoms. At necropsy various necrotic areas were found in the liver, lungs, and heart, and in these areas the streptothrix was found by the microscope and by culture. This organism was virulent for rabbits and mice. Its characteristics were the same as those of Hesse's Cladothrix alba, and also the same as those of the organism obtained from the sputum and from skin-abscesses by Scheele and Petruschky.

DISEASES OF METABOLISM.

GLYCOSURIA AND DIABETES MELLITUS.

E. Riegler² describes a **new test for sugar in the urine**, depending upon the use of phenylhydrazin oxalate. The test is carried out by taking about 1 cc. of urine, then enough oxalate of phenylhydrazin to cover the point of a knife-blade, and adding 10 cc. of water. This is boiled over a small flame, and shaken thoroughly until it is all dissolved. Then 10 cc. of a 10 % potassium-hydrate solution is added. The test-tube is now corked and shaken energetically. If sugar is present, the whole mixture will show, at once or within a minute, a marked reddish-violet color. A color appearing later is not characteristic. The test is said to show 0.25 % of sugar. [The influence of various substances besides sugar on this test should be studied before it is relied upon.]

H. Malfatti³ has studied the **fermentation-method of determining glucose** in normal urine, and has reached the conclusion that this **method is not reliable** for the quantitative determination of sugar in normal urine. Very irregular results were obtained with the test, and the author refers to the production of ammonium carbonate and, from this, of CO₂ as a serious source of error. He mentions impurities in the yeast as another source of error. He also especially insists upon the fact that the **toxic action of the urine interferes**, to varying degrees in different urines, with the fermentative activity of the yeast. He believes, however, that it is true, as Lohnstein has stated, that the amount of sugar present in normal urine is decidedly less than it has in recent years generally been thought to be. The figures that he has obtained are even lower than those of Lohnstein.

Pentosuria.—[We include pentosuria and levulosuria in the present section because they are at present chiefly of importance in relation to glycosuria and diabetes.] H. Brat⁴ reports a case of apparently **pure**

¹ Deut. Arch. f. klin. Med., Bd. lxxv, Hefte 1 u. 2.

² Deut. med. Woch., April 9, 1903.

³ Centralbl. f. Harn- u. Sexualorgane, Bd. xiii, Heft 10.

⁴ Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

pentosuria, and states that there are but 5 other cases on record. The condition, however, is probably more frequent than these figures indicate, for it is usually mistaken for diabetes. In this case, the **ingestion of 100 grams of glucose had no effect** upon the pentosuria and did not cause glycosuria. This patient had been considered by another practitioner to be a diabetic. The author has made a study of the methods of carrying out the orcin-HCl reaction for pentoses, and has found that the optimum temperature lies between 90° and 95° C. The reaction obtained at this temperature definitely indicates pentoses; but if a higher temperature is used, there may be confusion with some other substances that give a reaction exactly similar to that of methyl pentoses, and glycuronic acid also may cause confusion. Bial's addition of iron chlorid to the orcin-HCl mixture is not distinctive, as glycuronic acid reacts to this also.

F. Kaliski¹ recommends the use of Bial's modification of the orcin test for pentoses. He also states that he has **given 6 diabetics arabinose**, and has never found it in the urine afterward; while in normal persons, arabinose, when given in doses of 0.25 gram, regularly appears in the urine.

Levulosuria.—H. Rosin and L. Laband² discuss **spontaneous levulosuria and levulosemia**. They first insist that the great mass of previous observations concerning levulosuria in diabetes mellitus have been imperfect, in that the reaction of Seliwanoff has rarely been employed. In a **routine use of this test in diabetes mellitus**, the authors say that they have almost always found the reaction positive in urines that contained considerable amounts of sugar, even when there was no acetoneuria; and that it was also frequently positive even in cases that had but a moderate glycosuria. Quantitative determinations of the amount of levulose by difference in the titration- and polarization-results when Seliwanoff's reaction was positive, showed from 0.5 to 0.7 % of levulose. The authors also found that methylphenylhydrazin gave a methylphenylsazon, which occurs only with fructose, but not with the aldehyd sugars. They also describe a case in which there was a spontaneous marked levulosuria, which was **not increased by taking large amounts of levulose**. The patient had no noteworthy abnormal physical signs. Levulose was also found in the blood-serum in this case. In a later observation the amount of sugar excreted had largely decreased, and the anomaly was apparently improving decidedly.

L. Schwarz³ discusses levulosuria, particularly referring to the **excretion of levulose in diabetic glycosuria**. In 19 cases of diabetes he found 6 instances of a **combination of levulosuria and glycosuria**. There was no definite relation between the amount of levulose excreted and the food, except that in a number of instances it could be determined that administering levulose increased the excretion of this substance; and the author believes that diabetics with a tendency to levulosuria should receive but little levulose in their food, and that the previous

¹ Deut. med. Woch., Oct. 9, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

³ Deut. Arch. f. klin. Med., Bd. Ixxvi, Hefte 1-3.

teaching concerning this point must be modified. He also reports a case of spontaneous levulosuria without diabetes. [Spontaneous levulosuria and a tendency to alimentary levulosuria need further study, not only in relation to diabetes, but because of Strauss's claim that alimentary levulosuria indicates liver disease.]

E. Raimann¹ discusses glycosuria and alimentary glycosuria in mental diseases. He carried out a series of observations, in order to determine, first, how much glucose may be administered by mouth without causing the excretion of as much as 0.2 % of sugar in the urine. The highest amount of sugar that may be administered in this way, divided by the body-weight, was his factor in determining whether alimentary glycosuria was present or not. He found that the assimilation showed high figures in idiocy and in mania. In melancholia and in amentia, it was reduced. In paranoia, senile dementia, and progressive paralysis the conditions were not constant; but in progressive paralysis the assimilation was apparently somewhat decreased. Assimilation was good in epilepsy. In delirium tremens it was greatly reduced, particularly just after the delirium had passed off, rapidly increasing after this period. In alcoholics without delirium it was also decreased. In these patients spontaneous glycosuria was not observed, while it was common in the cases of delirium tremens. In one case of cocaine insanity assimilation was decreased. The author decides that the degree of assimilation of sugar is dependent upon the individual. It is influenced by exogenous and endogenous poisons.

A. Seelig² refers to the fact that glycosuria as the result of the inhalation of ether is known to have occurred, but has not been carefully studied. He has investigated the matter in dogs, and has found that in strong animals glycosuria regularly accompanies the inhalation of ether. This glycosuria may always be demonstrated during narcosis; after narcosis the sugar rapidly disappears (within 3 or 4 hours). With strong animals the glycosuria is very marked, and the sugar may equal 8 or 10 %; with weak or ill-nourished animals less sugar is excreted. There is apparently an accompanying hyperglykemia. The glycosuria was thought to be the result of a reduction in the oxidative processes, and intravenous infusions of oxygen were given at the same time that ether-narcosis was carried out. In these cases glycosuria never occurred. This, Seelig believes, demonstrates that the oxidative processes were reduced by the ether and that this produced the glycosuria. When glycosuria was already present, the use of oxygen did not control it.

Barba³ has injected suprarenal extract into 3 human beings, for the purpose of determining whether it produces glycosuria in man. He did not observe glycosuria in any of the cases. [We have observed it in several human subjects.] One was a case of Addison's disease. In this patient the injections caused the disease to grow worse. The others were, respectively, tabes and bulbar palsy. In both these cases improvement occurred.

¹ Zeit. f. Heilk., 1902, Bd. xxiii; Abth. f. innere Med., Heft 1.

² Zent. f. innere Med., Feb. 21, 1903.

³ Rif. med., 1902, No. 244

Nature and Etiology of Diabetes.—E. Bendix and A. Bickel¹ give another and a more detailed study of glycolysis. Among the more important facts collected may be mentioned the observation that phosphotungstic-acid precipitation and determination of the sugar in the filtrate, while constituting the best method at hand for estimating the blood-sugar, is not accurate. With different quantities of the same blood this method gives different results, the error being evidently due to the sugar in the blood that is combined with albumins. Unless a method shows results that are not only relatively but also absolutely correct, it is impossible to draw a definite conclusion concerning glycolysis. The authors further insist upon the fact that **other processes than those due to enzymes simulate glycolysis.** The blood itself destroys sugar by its oxidative action; and this is not, in the usual sense of the term, an enzymatic process. Micro-organismal action also can only with great difficulty be entirely excluded; and purely chemical processes, not dependent upon any organic process, cause serious error. Alkalies cause an actual oxidation of the sugar, the alkali itself acting as the oxygen-carrier; the alkalies also produce an intramolecular change in the sugar-molecule, and it is quite possible that even when in weak solutions they produce a direct splitting of the sugar-molecule, just as strong alkalies may produce lactic acid from dextrose. Their results indicate at any rate that the methods that have previously been used are entirely **insufficient to show that glycolysis occurs.** They do not indicate whether or not glycolysis actually occurs in the blood and shows alterations under pathologic conditions. The facts presented are purely experimental. The authors grant that it is quite possible that their results concerning the effects of alkalies are really of no importance, for it is certainly questionable whether the blood and the other body-fluids actually show any real alkalinity. [This report is a very instructive one in that it shows how feeble is the structure upon which the whole theory of glycolysis in the animal organism has been built. Glycolysis may be a very real and important process. There is as yet, however, no satisfactory testimony as to its activity.]

R. Lépine and Boulud,² discussing glycolysis in the blood, state that **blows on the head** that produce disturbance in respiration and in heart-action **reduce the glycolytic power of the blood.** The same effect is produced by poisonous gases and by the injection of minute amounts of adrenalin. The simple addition of adrenalin to blood in the test-tube does not reduce the glycolytic power of the blood. The addition, however, of 1 % of sodium-fluorid solution, even as long as 30 minutes after defibrinating the blood, stops glycolysis.

F. Steinhaus,³ at the suggestion of Minkowski, **examined the pancreas in 12 cases of cirrhosis of the liver.** In 11 of these cases he found advanced interstitial pancreatitis, with connective-tissue growth about the acini; in other words, he found conditions entirely analogous

¹ Zeit. f. klin. Med., Bd. xlviii, Hefte 1 u. 2.

² Compt. rend. de l'Acad. des Sci., cxxxvi, 1903, No. 2.

³ Deut. Arch. f. klin. Med., Bd. lxxiv, Hefte 5 u. 6.

to those in the liver. This, to his mind, indicates that the occurrence of diabetes in cirrhosis of the liver is to be attributed to the coincident disease of the pancreas, and that the testimony so far offered in favor of a hepatogenous diabetes is unreliable. This is in accordance with Minkowski's view that disease of the pancreas is present in all cases of diabetes [a view that is, up to the present time, supported by practically all the best work].

J. D. Steele¹ reports a case of typical diabetes in a man of 72. The disease has persisted for at least 6 months. At necropsy there were found **diminution in the number of the islands of Langerhans**, invasion of a certain proportion of the islands by fibrous tissue, and some compression and degeneration of the cells. The case belonged to the type of chronic interstitial pancreatitis with secondary and late involvement of the islands of Langerhans. It suggests that this form of pancreatitis may be associated with a diabetes quite as typical as that which occurs in the form that Weichselbaum and Stangl attribute to a specific cause, and believe to occur earlier and be more severe.

J. Boas,² in discussing **carcinoma and diabetes**, states that he has the notes of 366 cases of carcinoma of the digestive tract, in which there were 12 instances of combination with diabetes. In 7 of these the disease was situated in the rectum. In none of his cases was there any definite evidence that the diabetes had been secondary to the carcinoma; the diabetes had always been the primary affection. In a number of these cases there was evidence that the **carcinoma had acted antagonistically upon the diabetes**. The author also noted that in a number of instances the carcinoma had developed rapidly after the appearance of the diabetes. This fact he considers in its relation with the theory that carcinoma has some etiologic connection with the taking of excessive amounts of animal food. He also refers to a number of clinical observations by himself and others, relating to the effect of operation in cases of diabetes and to the danger of the onset of grave symptoms of intoxication. He reports a number of experiences that indicate that this effect may, however, be more favorable, and may at times even result in reducing the sugar-excretion.

A. R. Wierdsma³ has made a study of **phlorizin glycosuria** after subcutaneous and intravenous injections of phlorizin into a rabbit. He agrees with the authors that find that the phloretin-excretion comes to an end much more rapidly than does the glycosuria. He believes that phlorizin produces its results by causing temporary slight damage of the kidneys. This permits of the excretion of sugar for some time after the phlorizin has been entirely eliminated. He thinks, therefore, that this indicates that there **may be a renal diabetes**; and considers that Minkowski's theory as to the manner of action of phlorizin is probably incorrect. [The weight of opinion and many observations support the contrary view.]

De Dominicis⁴ discusses phlorizin diabetes and renal permeability.

¹ Am. Jour. Med. Sci., July, 1902.

² Dissertation, Leyden, 1902.

³ Berl. klin. Woch., March 16, 1903.

⁴ Gaz. degli Osped., No. 75, 1902.

He considers that he has proved that phlorizin diabetes is **not due to the action upon the kidneys**. He finds that after injecting phlorizin, the sugar-content of the blood increases, if the kidneys are extirpated. He has also shown that there is a large diminution in the glycogen in animals treated with phlorizin. He believes that the action of phlorizin is entirely similar to that of piqûre and the removal of the pancreas. The permeability of the kidneys is altered; but this, he considers, is not the primary factor.

O. Loewi,¹ in a study of the **function of the kidneys**, contributes a series of experiments that he believes indicate that the kidneys excrete crystalloids that come to them in free solution, but that they **do not excrete crystalloids that come in colloidal combination**. Together with a series of other interesting experiments, he reports some experiments on the excretion of sugar, which, he believes, demonstrate that the glycosuria after pancreas-extirpation and other forms of glycosuria, with the exception of phloridzin diabetes, are the necessary result of a hyperglykemia, which acts as follows: Under normal circumstances, the **sugars that enter the blood undergo a colloidal combination**; they circulate, therefore, in a form in which they cannot pass the kidneys. If an excessive amount of sugar enters the circulating blood, the "**combining substances**" **cannot be provided in sufficient amount**; hence, a certain proportion of the sugar is present in free solution, and this is quickly excreted by the kidneys. In phloridzin diabetes the glycosuria occurs because the kidneys have the power of breaking up the colloidal combination of the sugar, which normally exists. [The author, therefore, takes, in a certain sense, the contrary view to that which has recently become the favored one concerning phloridzin diabetes, though he does not attribute the condition to damage of the kidneys, but rather to their special functional activity. His view accords well with experience concerning the action of phloridzin when the kidneys are diseased.]

L. d'Amato² describes a case of **traumatic diabetes** that ended fatally from tuberculosis within 2 years of its onset. A careful post-mortem examination showed no changes that could be considered primary in the central nervous system, but there was marked atrophy of the pancreas, and the author thinks that traumatic diabetes is really pancreatic diabetes. He also notes the case of a boy that had been struck and had been greatly shocked by the blow. He immediately began to feel ill, emaciated continuously from that time, and soon exhibited thirst and glycosuria. He died within a year.

Lenné³ reports a case of severe diabetes mellitus that appeared **directly after an injury** to the knee. So far as could be learned, no evidences of diabetes had been present previously. There was also no history of the disease in the family. The author likewise mentions a **diabetic family** in which a son of about 12 years died probably of diabetes, and a daughter of 11 died soon afterward of rapidly progressing diabetes. In the same year the mother exhibited the symptoms of the

¹ Arch. f. exper. Path. u. Pharm., Bd. xlviii, Hefte 5 u. 6.

² Riv. crit. di clin. med., 1902, p. 184. ³ Berl. klin. Woch., May 18, 1903.

disease, ultimately dying of it. The author emphasizes the fact that the mother showed the disease later than the children.

J. H. Lloyd¹ reports a case of **diabetes mellitus in a child** 2 years and 2 months of age. The most interesting point about the case was the fact that the child had been operated upon only 10 days before symptoms of diabetes appeared, having been **under ether for nearly an hour**. He had apparently recovered perfectly from the operation, but 10 days thereafter he exhibited marked emaciation, seemed ill, and had a most intense thirst. Examination of the urine showed the presence of a large amount of sugar. The child died 4 days after having been seen—about 3 weeks after the first signs of illness had been noted. The cases of diabetes in children under 3 years of age have been collected by the author; they number 36. Six other cases are also mentioned. These were, however, apparently cases of alimentary glycosuria in children under 3, although they were reported as cases of diabetes mellitus.

R. Saundby² contributes a note on **alcoholism in relation to glycosuria and diabetes**, referring to the literature and to the fact that since his previous article upon the subject he has met with several cases of what he believes to have been alcoholic glycosuria. He describes one case in which 0.6 % of sugar was found in a confirmed alcoholic, this sugar having disappeared after a stay in the hospital. He mentions another case in which glycosuria was found in the supposed absence of a history of alcoholism. It was subsequently learned, however, that the man had earlier been in the habit of drinking freely. In relation to the question of the occurrence of **glycosuria in healthy persons**, he mentions a case in which no symptom could be found except marked glycosuria that persisted. It was found in this case that the man was in the habit of drinking freely. The author believes that observations of the latter kind are of much importance in relation to glycosuria in persons that are apparently healthy, but have a history of alcoholism; and he also considers the relation of alcoholism to glycosuria of importance in determining the judgment in cases of application for life-insurance. [The author accepts evidence of the correctness of his view somewhat too easily. There is good evidence that alcoholism may produce a glycosuria. The question whether it can directly produce a real diabetes is far from settled.]

P. Mayer³ has made an extensive **study of the carbohydrate acids**. He insists upon his previous view that glycuronic acid is a step in the process of the oxidation of glucose, and he likewise believes that oxalic acid is furnished by the further oxidation of glycuronic acid. He recognizes the view of Fischer that the pairing of glycuronic compounds takes place before the glucose-molecule is oxidized, but he believes that that author is not justified in this view. He also offers some experiments of his own that he believes indicate that Fischer's idea is incorrect. Mayer believes that gluconic acid is a stage between glucose and glycuronic acid, and that gluconic acid yields glycuronic. He closes with a discus-

¹ Phila. Med. Jour., March 21, 1903. ² Birmingham Med. Rev., Sept., 1902.

³ Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

sion of the incomplete oxidation of sugar in the human organism and with a restatement of his view that the excretion of glycuronic acid, when persistent, is an **indication that there is incomplete oxidation of carbohydrates** and that the patient should be suspected of being likely to manifest the signs of diabetes later, and, consequently, should be treated with a mild diabetic diet. [His expression in regard to this point is, however, far more reserved than in his original paper. The following paper by Bial shows how questionable is the clinical value of Mayer's opinion.]

M. Bial¹ discusses the question of the importance of glycuronic acid, especially its importance in indicating suboxidation in the organism, and in suggesting the danger of the development of diabetes. He believes that he has proved that the appearance of glycuronic acid in the urine may be dependent upon its being **formed in abnormal amounts in the digestive tract**, and not upon any primary abnormality in metabolism. He has been able to demonstrate the presence of paired **glycuronic acid in the feces**, the amount having greatly increased when menthol was given. In the latter circumstance he could demonstrate quite as much in the feces as has been shown in the urine in similar circumstances; and even then, he did not attempt to make a quantitative extraction of it. He thinks that this is sufficient to make it **impossible to draw any conclusions** concerning the condition of metabolism from a study of the glycuronic acid in the urine. He strongly criticizes the statements made by Mayer on the basis of qualitative tests for glycuronic acid in the urine. He calls attention to the fact that certain forms of paired glycuronic compounds are broken up by oxidizing agents with great difficulty. If, then, some of these compounds are present in considerable amount in the urine, the ordinary tests will give no reaction; while if other compounds, more readily broken up, are present in relatively small amount, the reaction will be obtained. Hence, he believes that **qualitative reactions give no indication of the amount present**. Quantitative determinations of the amount present would be the only method of learning whether a study of the glycuronic acid in the urine is of any clinical importance.

Symptomatology and Complications.—Fittipaldi² reports a lecture by De Renzi on diabetes. De Renzi insists upon the importance of marked **weakness of the lower extremities** in diabetes, attributing this weakness to changes in the spinal cord. He finds the knee-jerk weak in 76 % of the cases, but thinks there is no direct relation between the severity of the disease and the absence of the knee-jerk. There may be a **disturbance of sensation**—even dissociation of sensation, resembling that seen in syringomyelia; and De Renzi has seen a case of diabetic syringomyelia. A study of the **relation between tuberculosis and diabetes** in the medical clinic at Naples has apparently shown that in a large proportion of cases the pulmonary disease that is commonly considered to be tuberculous is not of that nature. The investigators have never been

¹ Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

² Gaz. degli Osped., No. 60, 1902.

able to discover the tubercle bacillus, but the diplococcus of Fraenkel was practically always present in the cavities and in the diseased lung-tissue. Experimental investigations on dogs showed that diabetic dogs have **no more marked tendency to tuberculosis** than have normal dogs. [The statements concerning tuberculosis will not be generally assented to. The importance of marked muscular weakness is properly emphasized. It is sometimes enough to suggest the diagnosis when otherwise unconsidered.]

Gutmann¹ reported to the Berlin Society for Internal Medicine a case of diabetes mellitus in a woman of 41, the patient having been admitted to the hospital in coma. Death occurred 2 days later. The pancreas showed no old adhesions and was readily removed from the surrounding tissues. It weighed 50 grams, was soft, and showed throughout nearly its whole extent an **infiltration with polynuclear leukocytes**. There was, however, no local abscess-formation, nor hemorrhage. Occasionally there were very small areas of necrosis. No bacteria could be discovered. This condition of the pancreas was not, however, believed to have produced the diabetes, because the woman was said to have had diabetes for at least a year, because the postmortem examination showed the presence of typical diabetic kidneys, and because the patient was greatly emaciated. It is, however, highly probable that the acute pancreatitis had caused the diabetes to become rapidly much more severe and had also caused the onset of the coma. A similar condition of the pancreas has apparently not previously been described.

Stadelmann² demonstrated to the Berlin Medical Society specimens from a young diabetic that had died in coma. At the time that intra-venous injections of alkali were given, the pale color of the blood was noted, and it was found that the **blood-serum had a milky appearance** and contained large numbers of dust-like substances, which proved to be fat. Sixty cubic centimeters of blood contained 15 grams of fat. The fat was found in all the vessels of the body.

L. Schwarz³ has made a study of **lipemia in diabetes mellitus**, with particular reference to the question whether lipemia stands in direct relation with the high excretion of acetone-bodies. He contributes a series of **analyses of the fat-content of the blood** in normal persons and in diabetics. He found that it was readily possible to cause in diabetics a marked increase in the fat-content of the blood by merely administering a large amount of butter. There was, at the same time, an increase in the acetone-bodies. The author believes that lipemia is **due to a change in the form in which the fat circulates** in the blood, and that its cause is an alteration in the lipolytic power of the blood. The lipemia that occurs when but little fat is being taken and when there is no tendency to coma is, he believes, due to the rapid breaking-down of body-fat. He thinks that diabetics have regularly a somewhat higher fat-content of the blood than have nondiabetics.

¹ Deut. med. Woch., Feb. 12, 1903; Ver.-Beilage, p. 50.

² Zent. f. innere Med., Jan. 3, 1903, p. 27

³ Deut. Arch. f. klin. Med., Bd. lxxvi, Hefte 1-3.

Teleky¹ reports 2 cases of **pancreatic diabetes with icterus gravis**. Both occurred in men of about 50. In both, the first evident symptom was glycosuria. An antidiabetic diet did not cause the sugar to disappear from the urine in either case. The icterus disappeared after a few weeks. At this time the glycosuria disappeared, and did not return, in spite of the free use of carbohydrates and fats. The fat was badly absorbed. Icterus persisted until death. In both cases autopsy showed extensive changes in the pancreas, while the other organs were practically normal, the pancreatic disease having caused constriction of the choledoch duct. In the second case a cholecystenterostomy was carried out, but the patient died 4 days later.

M. Loeb² reports a case of diabetes in which, during a probable attack of grippe, a **gangrene of the left leg** developed and ultimately caused death. The gangrene was due to thrombosis of the femoral artery. It was probably not a typical diabetic gangrene, but was due to two factors: the presence of a high degree of arteriosclerosis, which was associated with the diabetes; and the influenzal infection, the latter producing a tendency to clotting, which, of course, had its most active effect in the vessels that exhibited the highest degree of arteriosclerosis.

Treatment.—Fittipaldi,³ reports a lecture by De Renzi discussing the diet. He states that **green vegetables should be freely used**, and considers that they are usually well assimilated by diabetics. He finds that if a diabetic has been brought to the point at which his glycosuria has been pretty well overcome by diet, he can assimilate 25 to 100 grams of levulose, given as such, in 24 hours, without any increase in glycosuria. De Renzi also strongly **recommends the free use of fruit**. One of the important points in the use of large amounts of vegetables and fruit is that it satisfies the feeling of hunger. The author does not believe in the use of short periods of fasting. [The use of fruit needs individualizing. It is not a general law that all diabetics can take fruit with profit. It is possible that determination of the absence of levulose from the urine may prove a simple way of classing cases that will do well on free use of fruits.]

Schuman-Leclercq⁴ discusses the **influence of vegetable albumin** upon the excretion of sugar in diabetes mellitus, particularly investigating the effect of roburat. He finds that experiment confirms the clinical view that vegetable albumin is an excellent food for diabetics. Besides its influence upon the sugar-excretion, it must certainly be of importance in relation to the kidneys, relieving them of the necessity for excreting a large amount of animal excretory products.

L. Schwarz⁵ contributes an extensive and valuable study of the **relation of various forms of fat to the excretion of acetone bodies** in persons with diabetes mellitus and with other diseases. In normal persons on a full diet, the addition of fat causes but a minimal increase in the acetone-excretion; and this increase is not constant, being present

¹ Wien. klin. Woch., No. 29, 1902. ² Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

³ Gaz. degli Osped., No. 63, 1902. ⁴ Wien. med. Woch., May 23, 1903.

⁵ Deut. Arch. f. klin. Med., Bd. lxxvi, Hefte 1-3.

only when the fat is greatly increased. In mentioning phosphorus-poisoning, the author agrees with others that there is a marked increase in the excretion of acetone-bodies, which is probably due to the destruction of body-fat. This is perhaps true, also, of the excessive excretion of acetone-bodies that occurs after using chloroform and after other forms of narcosis; and possibly, likewise, of the acetone-excretion in starving insane subjects. Schwarz is inclined to consider the **destruction of body-fat the cause of the excretion of acetone-bodies** in various other conditions, such as carcinoma and the conditions associated with gastrointestinal disturbances and with acute infectious diseases. It is evident, however, that whether it be body-fat or food-fat that causes the abnormal excretion, the immediate cause is an abnormality in the metabolism of the fats. The author insists that diabetics show marked variations in the excretion of the acetone-bodies when on a constant diet, and that normal persons also show some variation in this respect. The amount passed as acetone, on the one hand, and as oxybutyric acid, on the other, likewise varies with a constant diet. Butter, which contains a large amount of volatile fatty acid, causes a marked increase in the excretion of the acetone-bodies; but other fats that contain but little volatile fatty acid cause an increase, though one less marked. Schwarz has made a study of the **influence of the higher fatty acids**—palmitic, stearic, oleic, capronic, and erucic. They also increased the excretion. Valerianic and capronic acids had a marked effect, particularly the former. Propionic acid had no effect. This influence was not due to the coincident administration of a large amount of sodium salts. There was no definite quantitative relation between the amount of fatty acid administered and the excess in the excretion of acetone-bodies. Olive-oil had a variable effect, and **oleic acid caused no definite increase** in the excretion. The author has also studied the effect of a change in the albumin-ration while the fat-ration was kept constant. A marked reduction in the amount of albumin caused a marked increase in the acetone-excretion, probably as the result of the destruction of body-tissue. As to the clinical importance of these observations, he states that most diabetics will take a large amount of fat; and that, as a rule, the excessive excretion of the acetone-bodies that occurs immediately, soon becomes reduced. This is not always the case, however; and if the reduction does not occur, it is important to alter the diet. He thinks that in each case it is necessary to reach a conclusion as to the influence of the fats in the food upon the excretion of the acetone-bodies, and to **administer to each individual what he can successfully assimilate**. It is certain that the addition of some carbohydrate to the diet makes it much easier to assimilate a large amount of fat. Butter and similar fats that cause a marked increase in the acetone-excretion are, at the same time, the fats that are the most easily taken; hence, they must be used in fairly generous amount, within safe limits. Schwarz also contributes some further observations on the effect of gluconic acid, and believes that he has successfully established the fact that in many cases its administration **decreases the excretion of the acetone-bodies**. He has made some studies of caramel. This

had no effect upon the glycosuria; but it was also without effect upon the acetone-excretion, which it had been hoped that it would reduce. The author then studied the **influence of "hunger days"** upon the excretion of the acetone-bodies. He decides that the influence is often excellent, particularly when the patient is about to be changed from a diet containing carbohydrate to one free of carbohydrate. He also contributes some experimental observations upon the administration of *levorotary* β -oxybutyric acid, which has not previously been attempted in human beings. He finds that in the diabetic organism the influence is different from that in the normal person. The **destruction of the oxybutyric acid was the more incomplete**, the more severe the diabetes. With mild diabetes, it increased the acetone-excretion; but when the diabetes was severe, unchanged levorotary β -oxybutyric acid was excreted. Schwarz believes that the reduction in the carbohydrate-metabolism was the chief reason for the decrease in the power of oxidizing oxybutyric acid. He also studied the **influence of the ingestion of acetone**, investigating the excretion both through the urine and through the respiratory tract. This has not before been satisfactorily done. The acetone was only imperfectly destroyed in either normal or diabetic persons. [This work and that reviewed in the several abstracts following is of much practical importance. The great danger in the management of diabetes is in the production of grave intoxication through the necessary dietetic restrictions, and this kind of work will lead to important and more exact knowledge as to the best way to furnish enough nutriment and at the same time to avoid grave intoxication as long as possible.]

Satta¹ has investigated, under von Noorden's direction, the influence of various forms of fat upon the excretion of acetone. He finds that the **excretion varies decidedly with the character of the fat used**. In mild forms of diabetes comparatively slight effect is to be observed, but in the severe forms the effect is pronounced. Even as little as 12 to 15 grams of butter may suffice to increase the excretion of the acetone-group of bodies as much as 1 gram, the increase being chiefly of the β -oxybutyric acid. The other forms of fat investigated, which included hog-fat, beef-fat, olive-oil, and others, had only from one-half to one-third the effect of butter. The effect of butter is most marked directly after its use in increased quantity has been instituted, and usually decreases gradually. The effect is undoubtedly **due to the presence of lower fatty acids in the butter**. Whether the acetone is produced by oxidation of the fat or by synthesis is undetermined. **Butter should be freed of volatile fatty acids by washing**; and when butter-fats, in particular, are used in considerable quantities, one should give alkalies freely.

C. von Noorden,² in discussing the treatment of diabetes mellitus, states that even in mild cases one **should not give very large amounts of albuminous food**, since the prolonged use of large amounts of albumin apparently decreases permanently the tolerance for carbohydrates. The form of albumin most readily tolerated is the white of egg. After this, the author places, as about equal, vegetable-albumin, casein, and a mix-

¹ Rif. med., 1902, No. 223.

² Deut. Aerzte-Zeitung, 1902, Heft 22.

ture of egg-albumin and egg-yolk; and then muscle-albumin. In some cases an excellent effect is observed from temporarily **restricting the patient to one form of albumin.** The excretion of the acetone-group of bodies does not usually increase, even in severe cases, unless as much as 150 grams of fat is used per day; and this increase is controlled, if alkalies are employed. It is best not to limit the amount of fat given, but to **use special forms of fat.** Butter should be taken in small amounts only, because it contains many of the lower fatty acids. A better plan is to have the butter thoroughly washed, in order to get rid of these fatty acids. Of carbohydrates, **food made from oats** is often well taken in large amounts; but it is difficult to get the patients to take preparations of oats for a long time in any considerable quantity. Their use does not seem to increase the tolerance for carbohydrates in general.

K. Grube¹ refers to the recent work concerning the influence of fat upon the excretion of acetone and acids in diabetes, and states that in some clinical observations which he reports the amount of acetone rose and fell with the amount of butter or cream given to the patients, while the amount of **ham or bacon did not have the same effect.** He believes that diabetics should receive but little butter or cream, pork-fat being used to replace them to as large an extent as possible.

T. R. Offer,² from some **experiments concerning acetonuria**, has reached the conclusion that the condition is largely dependent upon the ingestion of free fatty acids, and that its occurrence is also largely **dependent upon abstinence from carbohydrates and upon subnutrition.** In the latter circumstances the body-fat that is destroyed provides sufficient material for the production of acetone. Neusser, in discussion, mentioned 2 cases of **hydrophobia in human subjects** in which there was marked acetonuria. In one case the condition appeared at the beginning of the signs of the disease. Löbl mentioned a case of **intermittent paralysis** in which there was a large amount of acetone in the urine on the day of the attack. [We have found no evidence of acid intoxication in 2 such cases.] The next day it had disappeared; but there was a trace of albumin, which had not previously been present. Löbl had tested a **series of cases of tetany** for acetonuria; and had found that even when the gastrointestinal symptoms were not marked, acetone was invariably present in the urine, as well as diacetic and oxybutyric acids. These indicators of abnormal metabolism disappeared rapidly, but they were followed by the signs of toxic nephritis [a very common sequel of this variety of intoxication]. Burger believed that nervous factors have much to do with the production of acetonuria. He noted that **pregnant women** constantly show acetone in the urine when death of the fetus has occurred. [We have found this untrue in at least one instance.] Schlesinger, from his personal investigations, did not believe that acetonuria is produced by subnutrition. He believed, indeed, that destruction of body-tissues may readily decrease acetonuria, through the production of carbohydrate from protein, and the control of acid-production that

¹ Zeit. f. diätet. u. physikal. Therap., Bd. vi, Heft 2.

² Zent. f. innere Med., 1903, p. 245.

this carbohydrate would exercise. [A theory that is not well supported by experience. Subnutrition must, at present, be considered to increase the danger of intoxication of this form.] He believed that **fat diabetics excrete acetone more readily than the emaciated**, but that this has by no means the same evil prognostic significance in the obese. He thought that in nondiabetics acetonuria most often occurs in well-nourished fat persons that are suddenly subjected to prolonged hunger or are suddenly put upon a diet of meat and fat. It occurs frequently in cases of **hyperemesis gravidarum**. In emaciated persons with rapid destruction of body-tissue,—for instance, carcinomatous and phthisical cases,—acetonuria is usually absent.

H. Zickler¹ has made a study of **Stock's acetone-reaction**, and finds that it is less simple and less reliable with urine than are the reactions previously used. It is not satisfactory with urine at all, unless the distillate be used. It is, therefore, not to be recommended.

Voltolini² has studied the value of **Riegler's diacetic-acid reaction** (sulfuric acid and iodic acid), and finds that there are so many errors connected with this reaction that it is of absolutely no clinical value; and that the only reactions that can be depended upon for this purpose are the ferric-chlorid test and Lipliawski's reaction.

A. Mosse³ gives a further discussion of the **potato-treatment for diabetes**. He believes that potatoes may be wisely used in nearly all cases and in nearly all varieties of diabetes, and likewise in the complications of the disease. He permits from 1 to 2½ pounds as the daily quantity. The use of potatoes causes a decrease of thirst and of glycosuria and an improvement in the general condition; while, if the patient then begins using bread again, there is increased thirst and glycosuria, potatoes again controlling this. Observations of metabolism and absorption show that the reduction in the sugar-excretion on the potato-diet is not due to imperfect absorption of the carbohydrate. In discussing the manner of action of potatoes, the author refers to the possible effects of their mineral salts, particularly the alkalies contained in them.

M. Kaufmann⁴ has made a study, under von Noorden's direction, of the **effects of various drugs upon the glycosuria of diabetics**. Opium and its derivatives, he finds, exhibit favorable effect in some cases, but no such effect in most cases. The chief importance of drugs of this class is in finally controlling the remnant of a glycosuria that has been almost entirely overcome by diet, but will not entirely disappear by this means. Mercuric chlorid seemed to do some good in one case, but was useless in two cases. **Salicylates and aspirin** were used in a considerable series of cases, with fairly satisfactory results. On the whole, the author recommends drugs of this class. They have no specific action, but they do seem to increase the tolerance for sugar to some extent.

R. T. Williamson⁵ discusses the treatment of glycosuria and diabetes

¹ Prag. med. Woch., 1902, p. 112. ² Zeit. f. klin. Med., Bd. xlvi, Hefte 3 u. 4.

³ Rev. de Méd., Feb.-July, 1902. ⁴ Zeit. f. klin. Med., Bd. xlvi, Hefte 3 u. 4.

⁵ Brit. Med. Jour., Dec. 27, 1902.

mellitus with **aspirin**, and reports a series of cases in which this drug was used. He found that in the less severe forms of the disease and in chronic glycosuria it had good effects. In the most severe forms and in the acute forms that occur in young persons, no definite change could be noted. The dose required was 5 grains, 4 to 6 times a day. The drug must be watched. The author considers it important to administer it in solution with a little acid, such as lemon-juice, as this prevents gastric trouble.

M. Boigey¹ states that he has **used calcium salts with success** in 3 cases of diabetes, two of them being very mild cases, in which the symptoms almost disappeared; and the third being a severe case, which was greatly improved. He believes that this effect was due to the affinity of sugar for calcium. [There is far too great a general tendency to drug diabetics. Kaufmann's statement that drugs serve only to aid proper diet in producing its effect gives the rational view. Drugs are frequently useful, but should be considered a secondary part of the treatment. It is possible that calcium may do good, however, as calcium is usually lost in excessive amounts.]

DIABETES INSIPIDUS.

E. Pribram² contributes some **clinical observations on 10 cases** of diabetes insipidus, with very useful references to the literature of the disease. He excluded all cases of hysteria with polyuria, and all those with any demonstrable organic disease of the brain. Nothing definite could be stated as to the etiology in any case. Three cases were in females and 7 in males. Almost all the patients had first shown the condition in the third or the fourth decade. There was **no history of heredity** or of constitutional or nervous disease in the families. Two of the patients showed infantilism. Tuberculosis was present in 3 cases. It was, therefore, relatively uncommon. **Syphilis was not present** in any case. All the patients had severe thirst, and all had a tendency to gastric disturbance when this thirst was not quenched. Six patients had loss of appetite, and one had bulimia. Four cases were **tested for alimentary glycosuria**, with entirely negative results. In one case there was enuresis, which is uncommon in this condition in adults. Almost all the cases showed disturbance of the sexual function. Two patients manifested an **abnormal desire to sleep**. Four had severe headache; and 2, severe pains in the eyes. The author emphasizes the fact that **2 cases had beginning optic atrophy**. The nerve-supply of the eye-muscles was involved in one case. One patient had sciatica. In practically all the cases the **patellar reflexes were much excited**. Sweat-secretion was reduced in all except the tuberculous. There was, in a number of the cases, a peculiar relation between pulse-frequency and polyuria, these being in inverse proportion to each other. In many of the cases the apex-beat and the radial pulse were extremely weak. In

¹ Gaz. hebdom. de Méd. et de Chir., Oct. 12, 1902.

² Deut. Arch. f. klin. Med., Bd. lxxvi, Hefte 1-3.

one case there was a marked hemorrhagic diathesis—a condition that has been observed previously. Observations were made to determine the **rapidity with which these persons excreted** the large amount of water they drank. As compared with normal persons, they **showed marked bradyuria**; but the author does not consider that this slow excretion of urine is enough for a positive differential diagnosis. This symptom is, however, of importance in prognosis and in therapy. The point upon which Pribram lays most stress is the fact that in almost **all these cases there was some evidence of disease of the central nervous system**. It was not enough to establish a diagnosis of any particular local or general disease of the nervous system, but it manifested some abnormality in the nervous system.

T. W. Talqvist¹ has made a study of **various questions of metabolism** in a case of diabetes insipidus. He found that in this case, even with a diet containing only 3.76 grams of albumin-nitrogen, there was no nitrogen loss. Hence, the results mentioned by Strubell are certainly not characteristic of all cases of the disease. The author found that the percentage of different substances in the urine varied but little after marked changes in the diet. It is particularly notable that the sodium chlorid showed very slight changes. The amount of the urine, however, showed a **direct relation to the character of the diet**, increasing with the quantity of excretory products passing the kidneys. Talqvist believes, therefore, that diabetes insipidus is not due to an increase in the secretory activity of the kidneys, but is rather a **reduction in their excretory power**; that is, the kidneys excrete only with difficulty, and **pass solids only in abnormally large dilution**. In normal circumstances the kidneys probably reabsorb in the tubules some water excreted in the glomeruli; and it may be that it is this function that is disturbed in diabetes insipidus. In this case, at any rate, a diet that contained the smallest possible quantity of nitrogenous substances and of salts caused the patient to improve in general condition. This is in direct accord with the theory of the nature of the disease that Talqvist suggests.

R. von Jaksch² reports that in several estimations of the **amido-acid nitrogen** of the urine in a case of diabetes insipidus, he found that this fraction of the urinary nitrogen was very largely increased. This observation is of decided interest, as it indicates a definite abnormality in the chemistry of metabolism in the person studied; and it is one of the very small number of facts that we possess in regard to the nature of this disease. The amido-acid nitrogen was also found increased in hypertrophic cirrhosis and in typhoid fever.

D'Amato³ discusses the **relations between diabetes insipidus and diabetes mellitus**. He considers that diabetes mellitus not infrequently becomes transformed into diabetes insipidus. The contrary is not common. He has been able to find reports of only 4 cases. He adds 2 new cases of this variety. In one case the transformation occurred within somewhat over a year; in the other case, it took many years.

¹ Zeit. f. klin. Med., Bd. xlix, Hefte 1-4.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

³ Rif. med., No. 110, 1902.

M. von Zeissl¹ reports a case of **diabetes insipidus in a syphilitic**, in which antiluetic treatment caused a rapid and decided improvement. The lack of either subjective or objective cerebral symptoms made it questionable whether there were any local syphilitic lesions of the brain, such as have been described in other cases as the cause of polyuria. The author is inclined to believe that there are anatomic changes in the kidneys in these cases.

J. R. O'Brien² reports the case of a man aged 35 who had had severe emotional strain. The patient developed suicidal impulses; and, with this mental condition, had intense polydipsia and a very marked degree of polyuria, passing about 8 quarts of urine per day. Various treatments had been ineffectual. Finally, **hypnotism relieved him** of his mental disturbance. After hypnotism had been carried out for about 2 months, it relieved him of all the signs of diabetes insipidus.

GOUT.

Nature and Etiology.—O. Minkowski³ agrees that Nicolaier is probably right in thinking that the **deposits after the use of adenin** are 6 amino- 2.8. dioxypyurin. He is inclined to believe that the deposits which he himself found were composed of this substance. He had previously thought of this, but had not had sufficient material to determine it. He considers it, however, very important in a way not noted by Nicolaier; for it is very remarkable that adenin, when given as such, is deposited in the form of 6 amino- 2.8. oxypurin; while it is well known that nucleins contain adenin, and yet, when nucleins are given as such, there are no deposits. This makes it extremely probable that the **nature of the combination of the purin bodies** with other atom-complexes is of final importance in their fate in the organism. This would explain the differences as to the deposition of uric acid in gout and in leukemia, for instance; special combinations causing in one disease a deposit of uric acid, and in the other its excretion. It is known that uric acid tends to form combinations with nucleotin-phosphoric acid, one of the components of the nucleinic-acid molecule; and that this combination cannot be precipitated. This has suggested the use of **nucleinic acid in the treatment of uric-acid deposits**; and the results have been at least encouraging. Nuclein substances themselves, however, are not suited for this work, because they contain large numbers of purin bases. Minkowski has used the so-called **base-free thymic acid in gouty subjects**, with the result that there was an **increased excretion of uric acid** and the gouty deposits seemed to grow smaller. This might have been due to the fact that there were still purin bases in the thymic acid in sufficient quantity to cause the increased uric-acid excretion; but the results are, at any rate, very suggestive, and the observations have much theoretic interest.

F. Soetbeer and J. Ibrahim⁴ discuss the **fate of uric acid in the**

¹ Wien. med. Presse, No. 32, 1902.

³ Deut. med. Woch., July 10, 1902.

² Dublin Jour. Med. Sci., Nov. 1, 1902.

⁴ Zeit. f. physiol. Chemie, Bd. xxxv, p. 1.

human organism. They claim that **when taken by the mouth uric acid is not absorbed.** They added uric acid to a known diet, determined the excretion of nitrogen before and after the experiment, and also determined the amount of uric acid in the urine. They found no increase in either uric acid or nitrogen, and have decided that the uric acid was not absorbed. This decision was further supported by the fact that the nitrogen in the feces was increased in amount by the ingestion of the uric acid. The authors could not, however, find uric acid in the feces. They **injected uric acid subcutaneously** dissolved in piperazin. There was an immediate increase in the uric-acid excretion in the urine, and this lasted for days, the excess in the amount excreted being far more than the quantity injected. There was also an increase in the nitrogen excretion, and the authors believe that the uric acid was shown to have **acted as a tissue-poison.** They think that the uric-acid increase in the urine was chiefly due to tissue-destruction. [The conditions in leukemia make such observations of very doubtful importance; simple excess in the amount of uric acid in the system cannot explain gout. A much more profitable line of thought is that suggested in Minkowski's paper.]

M. Kaufmann and L. Mohr¹ discuss the **question of the alloxur-bodies and the pathology of gout.** They have made an extensive study of the influence of various diets upon the excretion of uric acid. They have determined, they believe, that the **use of nuclein-free albuminous food** does not notably increase the excretion of uric acid. There may be a slight increase, but this may readily be attributable to the increased activity of the intestine in digestion. The **use of carbohydrates was studied**, and it was found that they decrease the endogenous alloxuric values. Fat also decreased the endogenous alloxuric excretion. They have determined, therefore,—for the first time, they believe,—that nuclein-metabolism is **controlled in the same way as general albumin-metabolism**, by variations in the caloric value of the food; in this case, using other substances than those yielding alloxuric bodies. This is of importance because nuclein-destruction occurs only in living protoplasm, and not in so-called circulating or reserve albumin. The excretion of endogenous alloxuric bodies is an **indication of the normal nuclein-metabolism**, and may be considered as an indication of this even when the person eats only nonnucleinic food, if the caloric value of the food is still sufficiently high. As to the question whether persons nourished in a similar way and those that are in a similar metabolic condition excrete similar amounts of alloxuric bodies,—a question that has been answered in the affirmative by Loewi,—the present authors state that a positive answer cannot be given; but they doubt the correctness of Loewi's view. The question whether **individual factors play a part in the excretion**, they answer fairly positively in the affirmative. The exogenous alloxuric bodies seem to show variations that depend both upon the personal characteristics of the individual and upon his temporary condition. [We shall have to dismiss most of our ideas based upon determination of the uric-acid excretion alone; this practically

¹ Deut. Arch. f. klin. Med., Bd. lxxiv, Heft 1 u. 2.

means that, clinically, we must begin at the subject entirely anew. We know nothing of importance concerning uric-acid excretion until we know how much is endogenous and how much exogenous; and then the subject is merely opened.]

M. Kruger and Schittenhelm,¹ in a study of the **purin-bodies in the feces**, found that in an investigation lasting 42 days, in one person, there was, in all, 4.655 grams of purin-bases; that is, 0.11 gram per day, or 0.0532 gram of purin-base nitrogen. The urine in the same time averaged 0.0166 gram of purin-base nitrogen; so that about 3 times the amount was excreted in the feces that was found in the urine. The greater part of that found in the feces was guanin, though nearly one-third was adenin; only a small fraction was xanthin and hypoxanthin. The presence of guanin and adenin, particularly of the latter, is somewhat remarkable. Weintraud, in an abstract of this article, makes the statement that these purin bases are probably **not found preformed in the intestinal contents**, but appear in the treatment of the feces with sulfuric acid, being produced chiefly from the nuclein-containing material derived from the intestinal wall.

Diagnosis.—T. Futcher² discusses the **frequency of gout in the United States**, and contributes an **analysis of 36 cases** observed in the Johns Hopkins Hospital since January 1, 1894. He believes that the disease is almost as frequent in the United States as in England; for the records of St. Bartholomew's Hospital show, during 13 years, only one-third more admissions for gout than do the records of the Johns Hopkins Hospital. In only a very small percentage of the cases was there any history of heredity. Most of the patients had been in the habit of using alcohol, and the majority used fermented liquors. Rich food was not an active agent, though there were a number of overeaters. Lead seemed to bear a relation to only one case. Three were acute cases. Of the remaining 33, 17 showed tophi. Seventy-five % of all the cases showed evidences of renal change. The author believes that many cases of gout are overlooked in this country; he particularly refers to the fact that 4 of the cases had repeatedly been admitted and discharged with the **diagnosis of rheumatism**, the subsequent appearance of tophi having shown the true nature of the disease. In one case these tophi had been mistaken for fibroid nodules. The author refers to his **observations of uric-acid excretion** in these cases, and states that he has almost invariably found the uric acid very low just before the attack. On the second or third day after the beginning of acute symptoms, the curve rises, reaching the upper limit of normal excretion or higher; it then sinks to a very low point, as the symptoms subside. In one very marked chronic case Futcher failed to find any uric-acid excretion whatever on certain days during the interval.

I. W. Hall³ describes an instrument that he calls the **purinometer**, which is intended for the clinical estimation of the purin bases and the uric acid in the urine. He discusses briefly the importance of estimating

¹ Zeit. f. physiol. Chemie, Bd. xxxv, p. 350.

² Jour. Am. Med. Assoc., Oct. 25, 1902.

³ Brit. Med. Jour., Nov. 1, 1902.

both the endogenous and the exogenous purin, in determining whether the elimination in any individual is the normal one. He also states that in some observations upon the fecal purins he has reached the conclusion that they may, for clinical purposes, safely be disregarded.

H. Wildbolz¹ reports a case in a woman of 57, in which there occurred about the hands and elbows, and also about the feet, **nodules that appeared with inflammatory symptoms.** All the disturbances subsided after chalk-like excretions had been extruded. It is not stated whether there were definite joint symptoms or not. Tophi were not present in the cartilages of the ear. Uric acid was not present in the nodules, but phosphates and carbonates were found. The author cites 3 similar cases.

Treatment.—Huber and Lichtenstein² discuss the treatment of gout with **quinic acid**, referring particularly to the anhydrid of quinic acid, which is sold under the name of "new sidonal." It was given in a series of cases of gout, in doses of 10 grams daily. Clinically, the authors observed very marked improvement in the pains and in the local objective joint-signs. They also investigated the influence of the drug upon the excretion of uric acid. This was regularly less when this substance was given than when no remedy was used; and the authors think that uric acid certainly has an important relation to gout, and that anything reducing the production and excretion of uric acid is likely to have an excellent effect upon this disease.

EXOPHTHALMIC GOITER.

G. R. Murray³ gives a general report of his **experience with 120 cases** of exophthalmic goiter, **110 of which were in women**, somewhat more than half of the latter being married. The vast majority of the cases occurred **between the fifteenth and the thirty-fifth year of life.** No family history of exophthalmic goiter was found in any case. Emotional exciting causes were often determined to be present. The author notes one case in which the symptoms of the disease all came on with remarkable rapidity. In one case rapid respiration was the **first symptom noted.** The **first sign observed was usually enlargement of the thyroid gland.** This was **enlarged in 117 cases;** there was absolutely no enlargement in 3. In 14, goiter had been present before the symptoms of Graves's disease. The enlargement was generally uniform. The frequency of the pulse was distinctly increased in all cases, varying from 90 to 200. Heart-murmurs were common. **Exophthalmos was present in 79 cases**, but in 32 there was absolutely none. Von Graefe's symptom was present in 36 out of 91 cases. Stellwag's sign was observed in 47 cases, and noted as absent in 29. The characteristic tremor was present in 111 cases. The general peculiar nervousness, common in the disease, was noted in 70 cases and was stated to be absent in 3. One patient was insane; 2 had hallucinations, but were sane; and other marked

¹ Correspondenzbl. f. Schweiz. Aerzte, No. 8, 1902.

² Berl. klin. Woch., July 14, 1902.

³ Lancet, Dec. 12, 1902.

nervous symptoms were fairly common. A sudden temporary marked intensification of the symptoms was repeatedly noted. Diarrhea was observed in 35 cases. The condition of the urine was recorded in 19; in 4 of these a trace of albumin was found, and sugar was discovered in 3. Loss of weight was a very common symptom. The **briefest course with recovery was about 9 months.** In the treatment, Murray recommends the rest-cure, electricity, and massage, with careful dieting. Drugs are of symptomatic use only, and the author considers them disappointing.

H. Campbell¹ states that he frequently sees cases, which he calls Graves's disease, that are usually overlooked because of the **absence of exophthalmos and of pronounced enlargement of the thyroid.** The symptoms exhibited by these cases are extreme nervousness, tremor of the hands, and tachycardia. If such symptoms are constantly present, the author considers the diagnosis to be fairly certain; and he believes it to be undoubted, if the patient is also emaciated, perspires profusely, and has a pigmented skin. He considers the **most striking feature of Graves's disease to be the extreme nervousness.** Cases without typical Graves's disease, but with many of the symptoms, may, he thinks, be due to exaggerated physiologic activity of the thyroid gland, without any actual disease of the gland. [There is no definite proof that cases of the form discussed are exophthalmic goiter. The whole subject of these atypical cases is as yet so obscure that dogmatic views are not very helpful.]

B. Spiethoff² reports a series of investigations of the **blood-pressure in exophthalmic goiter**, in which 20 cases were studied. These were divided into 5 groups, according to the results obtained. The first group includes those with abnormally low pressure; the fifth, those with the highest pressure, which was distinctly above the normal. The first and fifth groups consisted largely of persons who were the most severely ill of those studied. The other 3 groups showed no definite characteristics, except that, as a general statement, it might be said that the cases with the lower blood-pressure were the severer cases, and that those with the higher pressure were the milder ones. The rapidity of the pulse seemed to have no direct relation to the severity of the disease. The author decides that the blood-pressure in exophthalmic goiter shows no constant variations of any character. It is **incorrect to state that the blood-pressure is always high or always low**, as some authors have done. Any condition of the blood-pressure may be found in the severe cases, although it is usually excessively high or excessively low; in the mild cases it is about normal.

J. Donath³ reports a series of cases of exophthalmic goiter in which he made determinations of the blood-pressure by the Basch, the Hawksley, and the Gärtner instruments. He found, in brief, that with the Basch instrument the figures were usually either normal or increased; less commonly, decreased. With the Hawksley, the number of cases in which the pressure was increased about equaled that of those in which it was

¹ Brit. Med. Jour., Nov. 1, 1902. ² Centralbl. f. innere Med., Aug. 23, 1902.

³ Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

decreased. With the Grtner, most of the cases showed increased or normal conditions. The author believes that the **blood-pressure is usually increased or normal**, rather than decreased; hence, he thinks that the disease is not due merely to an excessive, though normal, secretion of the thyroid gland; for extract of the thyroid gland causes reduction in the blood-pressure.

H. Stern¹ discusses the **association of Graves's disease with glycosuria and diabetes mellitus**, reporting first a case of spontaneous temporary glycosuria and then one of actual diabetes, which arose after the appearance of exophthalmic goiter. He finds 24 definitely recorded instances of Graves's disease and glycosuria, 22 of them in females. He **does not believe that the association is merely accidental.**

L. von Schrtter² reports a case of exophthalmic goiter in a woman of 27, in which there was **deep and widespread pigmentation of the skin** of the lower half of the abdomen and of the lower extremities. The latter condition is similar to that seen in a number of cases in which the observers have thought that there was more or less complete transformation of exophthalmic goiter into myxedema. The author believes that his case indicates that in a number of instances, at least, this view has been erroneous. A portion of the skin and subcutaneous tissue was removed and examined microscopically. The operation was not followed by any leaking of fluid; but the fat welled up into the wound to such an extent that it was impossible to close it, and later the stitches tore out. Microscopic examination of the tissue showed that the **condition of the skin was due to a large increase in the amount of fatty tissue and to a thinning in the connective tissue.** Owing to the latter change, the fat was not normally compressed by the connective tissue, the result being the tense distention and thickening of the skin. Schrtter believes that there are pure cases of exophthalmic goiter and pure cases of myxedema, the one being due to hyperthyroidism and the other to athyroidism. One condition may readily be conceived of as passing into the other; but there are, further, cases of dysthyroidism that are due to abnormal secretion; and the author believes that these are not so rare as has commonly been supposed. He thinks that it is quite possible that the 3 conditions may often show transformations into one another. In the case reported thyroidin caused marked improvement.

C. S. Potts³ reports a case of exophthalmic goiter in which there was an **extremely intense general tremor**. Persistent ankle-clonus was present, and **attacks of apparent unconsciousness** occurred. In these attacks, however, the patient knew what was going on about him. He had hysterical color-fields and other evidences of hysteria, and the **attacks were considered to be hysterical**. The patient had absolutely no sign of disease of the spinal cord.

Treatment.—A. Kocher⁴ discusses 93 cases of Basedow's disease

¹ Jour. Am. Med. Assoc., Oct. 18, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

³ Phila. Med. Jour., Nov. 22, 1902.

⁴ Mitt. a. d. Grenzgeb. d. Med. u. d. Chir., Bd. ix, Hefte 1 u. 2.

treated in the clinic at Berne, 59 of which were operated upon. He insists upon the importance of surgical treatment in this disease, and advises operation in every case, repeated operations in some cases being counseled. The preliminary operation should be ligation of the superior arteries. In 14 cases he carried out unilateral excision; in 16, ligation of the arteries; in 19, unilateral excision and ligation of the arteries; in 4, unilateral excision and partial resection; in 1, ligation of the arteries and partial resection; in 3, unilateral excision, partial resection, and ligation of the arteries; and in 3 ligation of the arteries and resection of the sympathetic. The effect was in direct proportion to the completeness with which the operative procedure had excluded the gland from the circulation. The report is accompanied with numerous details and with a very extensive study of the literature. Of the 59 patients, 4 died, 45 were completely cured, 8 were much improved, and 2 were slightly benefited. The only symptoms remaining in any of the cases that are said to have been cured was exophthalmos; this disappeared completely in only 26 cases. All the cured cases showed an entirely normal condition of the heart. As internal treatment, the author recommends bromids, arsenic, iron, and particularly sodium phosphate. Climatic treatment and hydrotherapy are also valuable. Iodid treatment has undoubtedly made many beginning cases worse. Internal treatment causes improvement at first, but is usually followed by relapse. In only one case was an objective cure attained. In 2 cases he observed a symptom not previously described, which he terms trembling of the iris. In 43 of 58 women, there were disturbances of menstruation before the beginning of the disease; in 42 of these there was a decrease in menstruation. In the cured cases the menstrual condition became normal. The author reports the postmortem conditions in several fatal cases; and the histologic changes in 9 goiters, in contrast with the condition under discussion. He also reports 2 cases of pseudo-exophthalmic goiter and 18 of vascular goiter.

O. Lanz¹ has treated a series of 6 cases of exophthalmic goiter with the milk of goats that had been deprived of their thyroid glands. He describes striking improvement with reduction of all severe symptoms, the improvement having continued after the use of the milk had been stopped. In one case the milk, according to the author's description, caused recovery from practically the terminal stage of the disease.

ARTHRITIS DEFORMANS.

R. L. Jones² has made an extensive study of the reflexes in rheumatoid arthritis, particularly in asymmetric types of the disease, by comparing the reflexes in an affected limb with those in its unaffected fellow. He finds that the deep reflexes are almost uniformly more brisk on the diseased side, and there is a striking relation between the diseased joints and certain reflexes. In cases of disease of the ring and the middle finger, the reflexes of the flexors give a more vigorous response

¹ Münch. med. Woch., No. 4, 1903.

² Lancet, Dec. 27, 1902.

than do those of the extensors; while the contrary is true when the index finger and the thumb are affected. With disease in the lower extremity the knee-jerk is exaggerated on the diseased side. This may be noted even before the knee is affected. The superficial reflexes are extremely variable. In a few cases the author has noted a Babinski sign. He insists upon the striking harmony that prevails between the gluteal and the plantar reflexes, sluggishness in one—or the contrary—being found coincidently in the other. With a sluggish plantar reflex, the skin of the sole is found to be more sensitive to pain than that of its fellow; there is a decrease in common sensation and an increase in pain-sensation. The knee-jerks are often increased to a degree compatible with sclerosis, and they may be clonic. The tendon-reflexes in the upper limb may be equally active, and ankle-clonus occurs. The author has even seen clonus appear with the patient lying in bed, the leg being merely extended, with no pressure upon the sole. Clonus is not common, however, except in the acute forms of the disease. In symmetric cases it is difficult to determine an alteration in the reflexes produced by the disease, as opportunity for making a comparison is lacking. Jones has, however, seen reflexes in the upper limbs increased when the disease, in an acute form, was confined to the lower limbs. He believes that **reduction in myotatic irritability occurs in those cases in which complete recovery** from the fusiform stages occurs, and that this has **decided prognostic value**. Incomplete recovery from myotatic irritability is suggestive of a fresh outbreak, while persistent diminution in this excessive irritability is an excellent sign. The author's study of the reflexes and of their relation to the joints leads him to the conclusion that the association in this disease of special alterations, particularly in the plantar and the gluteal reflexes, indicates **segmental disease of the spinal cord**. In 1 instance out of 100 cases he has seen reduction in the tendon-reflexes. He also notes 2 cases in which there was incontinence of urine and 1 in which there was incontinence of feces following the onset of rheumatoid arthritis, another in which there was retention of urine, 2 in which deglutition was impaired, and 1 in which a striking weakness of the muscles of respiration was the immediate cause of death. The light-reflexes of the eye, also, may be diminished. As the result of all these observations, Jones decides that the disease is due to a toxemia that has a segmental action upon the spinal cord. He does not think that the disease is confined to the anterior cornua of the cord; and, while he believes that it is infectious, he does not think that there is a specific infection. He also refers to the **frequency of flat-foot in rheumatoid arthritis**. He insists, finally, that there is an **undue tendency to centralize the disease in the joints**, to the unfair exclusion of the muscular and the sensory symptoms. [There is excellent reason for suspecting that some cases of arthritis deformans are of infectious origin; and if that is true it is highly probable that there is no specific infection. The testimony in favor of infection relates, however, chiefly to one group of cases that are probably distinct from the others; *i. e.*, to the cases that are acute or have a tendency to occasional somewhat acute exacerbations, and particularly to those in which there is a tendency to distinct fever.]

R. L. Jones¹ further considers that there is a **definite relation between exophthalmic goiter and rheumatoid arthritis**. He gives a table of cases in which there was such an association, including 6 in which larval Graves's disease was associated with rheumatoid arthritis, and 14 in which, with rheumatoid arthritis, the four cardinal symptoms of Graves's disease were present. Sometimes the symptoms of one disease were primary, and sometimes those of the other. He believes that there is a neuropathic diathesis in both diseases, and that toxemia is active in each.

R. L. Jones² also discusses **vasomotor and ocular phenomena in rheumatoid arthritis**. He believes that the periarticular swellings of rheumatoid arthritis are due to vasomotor disturbances, because of the occasional occurrence of local syncope, etc., in a finger, and the development of spindle-shaped swellings in the same digit; because, also, the swellings about the joint and the vasomotor phenomena tend to rise and wane concomitantly. That they are spinal in origin is, he believes, indicated by the fact that local asphyxia, when it occurs, tends to follow the paths of spinal nerve distribution; because the deep reflexes rise and wane concomitantly with the joint trouble. There is also a close **relation between rheumatoid arthritis and tetany**, he believes, because he has observed Chvostek's symptom repeatedly in the former; the cramps and spasms are also similar in the two conditions. He believes, too, that there is a relation between atrophy of the thyroid and rheumatoid arthritis.

E. M. Merrins³ discusses the **significance of Heberden's nodes**, and refers to the various conditions in which they may be found; mentioning gout, cancer, autointoxication from the gastrointestinal tract (Bouchard's type), rheumatoid arthritis, general wear and tear, and certain conditions allied to joint-affections—more particularly cases of local asphyxia closely related to Raynaud's disease. He states that in 27 patients seen during a year he has observed Heberden's nodes. Of these, 19 had undoubtedly deforming arthritis; 2 were gouty; and in 1 the nodes were due to senile change. The remaining 5 cases were in women, who first showed the nodes at about the time of the menopause. The author believes that most of these nodes belong to the osteoarthritic type of rheumatoid disease. They may, however, **occur in various conditions**, in all of which there is some mechanical, chemical, or more or less specific toxic irritant in the system, and also impaired general vitality. They are, however, most likely to occur in those conditions in which bony changes are the chief feature of the disease. Merrins does not consider them of sufficient pathologic importance to constitute a separate form of rheumatoid disease. They may appear as isolated phenomena.

SPONDYLITIS DEFORMANS.

J. Markiewicz⁴ reports 3 cases of **chronic ankylosing inflammation of the spinal column**, of the Marie-Strümpell type. The first

¹ Brit. Med. Jour., May 2, 1903.

³ N. Y. Med. Jour., Feb. 14, 1903.

² Bristol Med.-Chir. Jour., Dec., 1902.

⁴ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

occurred in a man of 38 years who was observed soon after the onset of his disease, which followed an injury. He had pains and tenderness in the lower lumbar region. Active movement of the spinal column was absent, muscular power in the legs was decreased, and the patellar reflexes were excited. There were marked pains in the sciatic nerves, and decided paresthesias and disturbances of touch-sense in the legs. The patient died about 6 months after being injured. The necropsy showed that the roots of all the sacral nerves were enveloped in compact connective-tissue. The sciatic nerves showed atrophy. After maceration of the sacrum the anterior and posterior foramen could not be seen. The various sacral vertebrae were massed together, and the canal was greatly narrowed. The bone was more compact than normally. The two other cases described were of the typical ascending variety, involving only the hip-joints and the spinal column. The author considers that **the syndrome is a distinct disease-entity**, and that it can be separated from other joint-conditions—particularly from deforming arthritis. [As a general statement this is hardly justifiable. The condition described by Bechterew is probably due to a special cause. In the present obscurity as to the nature of arthritis deformans, and particularly when all clinicians are not wholly agreed as to the cases that are and those that are not arthritis deformans, it does not seem wise to state dogmatically that these spinal cases constitute a disease distinct from arthritis deformans.]

M. Herz¹ has studied the **influence of stagnation of the circulation** upon the temperature of joints, and has also investigated the temperature of joints that showed chronic disease, with especial reference to the treatment suggested by Bier. He decides that the temperature of chronically diseased joints is lower than normal. Slight venous stagnation increases the warmth of an extremity and apparently produces a passive as well as an active hyperemia. With marked compression of the veins there is first an increase, and then a decrease, in the temperature. Compressing the main artery causes an immediate reduction in temperature. If circulatory stagnation is artificially produced, an extremity becomes warmer when placed in a light-bath than it would if there were no stagnation. In cold water it becomes cooler than it would if the circulation were free.

AKROMEGALY.

D. L. Edsall and C. W. Miller² discuss the **chemical pathology of akromegaly**, reporting some extensive metabolism experiments on one case and some observations in another. In the first they made observations of the total nitrogen, the phosphorus, and the calcium metabolism; and also investigated the degree of intestinal putrefaction, and the ammonia and acetone excretion. They found an extremely marked nitrogen retention, nearly 13 % of the total nitrogen having been retained. The phosphorus retention was still more marked, amounting to nearly 21 %; while the calcium retention was somewhat over 9 %. The conclusions reached by the authors are that the nitrogen retention is an

¹ Berl. klin. Woch., May 18, 1903.

² Univ. of Pa. Med. Bull., June, 1903.

evidence of **abnormal growth of the soft tissues**, since it was so extensive as to be evidently pathologic. The figures for phosphorus and for calcium, in connection with those for nitrogen, they believe to indicate not only an abnormal laying down of bone-salts, but also the production of **bone of abnormal composition**. Further, the phosphorus retention was so marked as to suggest the probability of the production of abnormal amounts of other tissues rich in phosphorus, and possibly to indicate that these tissues were themselves of abnormal chemical structure. Such tissues are probably largely those of the nervous system; and it is somewhat suggestive that the man investigated was an imbecile. The most striking point in the authors' work is the observation that an **undue amount of calcium was excreted through the urine**. There was no evidence that this was due to general acid-intoxication; and it was probably not due to an excess of volatile fatty acids. It indicates, however, that there is produced some **substance that unites with the calcium** and carries it off through the urine; and that, at the same time that there is abnormal deposition of bone, there is also abnormal solution of bone material. The authors emphasize the fact that in akromegaly there occurs a growth of abnormal bone, rather than an excessive growth of bone; and that the abnormalities are not confined to the bones, but are also found in the soft tissues. They consider it probable that further study will show that the alterations in the bones are the **result of a metabolic abnormality**, rather than of a mere tendency of the bones themselves to a distorted overgrowth. The metabolic abnormalities may be due to a disturbance in bone-metabolism itself; but it is equally possible that they are due to a general metabolic disease, resulting in peculiar akromegalic deformities of the bone.

MISCELLANEOUS METABOLIC AFFECTIONS.

W. Berent¹ reports a case that is of decided interest in relation to the **etiology of osteoarthropathy**. He first refers to the theories that have already been advanced concerning the origin of this condition; he particularly leans toward the theory of a neurotic origin. His case was that of a man of 56 years whose hand had been crushed when he was 46 years old. The hand had healed rapidly, leaving 2 fingers stiff. Two years later he had right-sided pneumonia. Subsequently to this he had pain in the left forearm, with occasional swelling of the hand. These pains persisted, and he was admitted to the hospital because of them. At this time it was found that he had an aneurysm of the left subclavian artery that, by pressure upon the brachial plexus, had produced a **severe interstitial neuritis** with secondary degeneration of the nerves arising from this plexus. He also had marked osteoarthropathic changes in this hand. There was no disease of the lungs to explain the condition; and no cardiovascular disease, except the aneurysm mentioned. It was possible that the aneurysm had produced sufficient passive congestion to cause the osteoarthropathic changes; but the author believes that it has

¹ Berl. klin. Woch., Jan. 26, 1903.

been satisfactorily demonstrated that passive congestion alone will not produce these changes, and, indeed, in this case there were no evidences of marked passive congestion. The only other cause for the condition was the neuritis; and he believes that this case shows that a **severe neuritis alone may cause osteoarthropathic changes.** When osteoarthropathy follows neuritis, however, it must be the result of disease of certain special fibers; because the majority of the cases of neuritis are not accompanied by any such changes.

Ferrio¹ discusses the **relation between club-fingers and hypertrophic pulmonary osteoarthropathy.** In club-fingers the characteristic condition found as a cause is disturbance of the circulation, resulting from thoracic or abdominal disease. The condition is limited to the last phalanges; and is, the author thinks, purely the result of a severe local circulatory disturbance—not of simple stasis, however. **Reflex vaso-motor changes** probably have much to do with the production of it. Ferrio reports a series of studies of *x-ray* photographs and of anatomic and microscopic preparations, which indicate that the bones in club-fingers show no change; but that the vessels of the skin show widening, and that there is slight round-cell infiltration about the vessels. The nerves show no changes. He believes that **osteoarthropathy and club-fingers are fundamentally different conditions.** They may occur together, but they are not due to the same cause or to the same changes in the skin.

E. Roos² discusses the question of the actual **existence of a late rachitis.** He describes the case of a child of 11 years who had had a severe attack of intestinal disturbance in the second year of life and had stopped walking for about 2 months. She afterward recovered entirely and was well until she was 11 years old, when, after her family had changed their place of residence, she began to exhibit difficulty in walking. Within a few years she showed marked bowing of the bones of the forearms and of the legs, with extremely marked enlargement of the epiphyses. The skull and the ribs remained unaffected. There were no signs of any of the rarer bone-diseases, and the *x-ray* examination showed conditions similar to those observed in rickets. The case was believed to be one of late rachitis. A similar case is mentioned, in which, however, there had been rachitis in infancy, which had become entirely cured. Bone-changes similar to those in the first case began to develop when the child was 15 years old, and increased to a very striking extent. The author believes that **rachitis may develop in the second decennium** in patients that have or have not had rickets in infancy; or, at least, that a condition that is not clinically distinguishable from rickets may appear at this stage of life. In these cases the skull is much less markedly involved than in infantile rickets. Roos considers further pathologic studies of this condition to be extremely desirable, in order to determine its exact nature.

H. D. Rolleston³ reports 2 cases of **persistent hereditary edema** of

¹ Morgagni, Aug., 1902. ² Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2

³ Lancet, Sept. 20, 1902.

the lower limbs in 2 members of the same family. The mother, who was 45 years old, had the same affection. In the children there was a permanent edema of the legs and feet. This increased after any physical strain and also after hot baths. After several days of complete rest it would disappear, and would then gradually return. It was painless and not severe in degree. The swollen skin felt cold, and pitted on pressure. The areas that were anemic remained so for some time. There were no structural changes, such as those seen in elephantiasis. Neither the history nor the physical examination showed any cause for the edema.

W. S. Thayer¹ describes a case of **hemorrhagic polymyositis** which occurred in a man of 34 years, who had had attacks of what he called rheumatism for about 5 years. These attacks chiefly consisted in evanescent shooting pains. His first attack of swelling of the muscles had occurred in 1899. The striking points in the case were the mildness of the pain, as contrasted with the marked muscle-swelling; and the fact that there was but little fever. The discoloration of the skin in the attacks was extremely widespread, and there was apparently deep hemorrhage almost without purpuric manifestations. An interesting symptom was **crepitus in the deltoid muscle**. The attacks suggested, in their abruptness, angioneurotic edema.

F. Forchheimer² reports one case of **dermatomyositis** in a woman of 40 years, who had been subject to traumatic and emotional strain. She had a pustule on the leg, followed by itching and erythematous eruption; and afterward by a more generalized erythematous rash, localized edema, and painful swellings of various muscles. There was also an urticarial rash, and the patient presented neurasthenic symptoms. She likewise had fever, a rapid pulse, and general weakness. The case was considered to be a characteristic one of dermatomyositis. The skin-lesions led to pigmentation; and the inflammation of the muscles, to atrophy. The course of the disease was 2½ months, and there was a very slow convalescence. The author says that if there is anything at all known about the etiology, it is that the disease **may be produced by a number of causes**. The diagnosis is easy only when the disease is typical and one has already seen a case.

C. Gerhardt,³ in discussing the **cure of obesity**, insists that it is quite possible to cause great damage by too rigid regulations, the chief evil results being a very marked loss of strength and decided irritation of the kidneys. He considers that certain drugs may wisely be used, in addition to dietetic measures. He has made some studies of the effect of **sodium borate**, to determine whether this has a satisfactory action, giving it to 3 persons. He found that 4 grains a day had little effect; 8 grains a day helped to reduce the weight and was well borne; 15 grains a day caused some bad effects, consisting chiefly in nausea, a feeling of oppression in the epigastrium, and afterward headache and pains in the extremities. He thinks, however, that this remedy may properly be further studied.

¹ Boston M. and S. Jour., Sept. 18, 1902.

² Boston. M. and S. Jour., June 11, 1903. ³ Therap. d. Gegenwart, 1902, No. 6.

DISEASES OF THE BLOOD.

METHODS OF EXAMINATION.

C. Strgyzowski¹ recommends the following mixture for **demonstrating the presence of blood** by the crystallographic method: Glacial acetic acid, water, and alcohol, each 1 cc.; hydriodic acid, 3 to 5 drops. This preparation should be used soon after being mixed. If it cannot be used immediately, it should be protected from light. This is a much more delicate test than Teichmann's, and gives much more satisfactory results.

W. Preitetschensky² describes a **new chamber for the Thoma-Zeiss blood-counting apparatus**, which is modified from the older form so that there are 100 large squares and, in all, 1600 small squares, their size being the same as in the old apparatus. In counting the leukocytes, he multiplies the number found in 100 large squares by 50, when the blood is diluted 1:20; or by 25, when it is diluted 1:10; this gives the number of leukocytes in a cubic millimeter.

Türk³ recommends, **for counting the leukocytes, a large chamber** containing 9 mm. of space. This permits of rapid and accurate counting. He also considers that one can perfectly well distinguish between the different kinds of leukocytes by adding gentian-violet to the acetic-acid solution used to dilute the blood. In this way, also, one can make accurate differential counts of the various forms of leukocytes. The author likewise considers that a very rapid and secure way of investigating for malarial organisms is to use the leukocyte apparatus in looking over the blood.

Memmi⁴ recommends **Friedländer's apparatus** for counting the leukocytes. He believes that the results are more accurate than those obtained by the ordinary Thoma-Zeiss instrument.

E. Aspelin⁵ discusses the value of examinations of the blood by means of the **hematocrit**. He decides that this instrument is **of some real importance** in ordinary clinical work, particularly to the practitioner. The determinations are easily and simply carried out, and one may readily determine an increase or a decrease in the volume of the red or of the white corpuscles. The instrument can never be sufficient to replace other methods, however, when accurate examinations are desired.

A. Dare⁶ reports a new method for **determining the alkalinity** of the blood by means of a special instrument. The essential points in the method are that the indicator used is the oxyhemoglobin, the fluid being observed with a pocket spectroscope, and the neutral point being considered to be reached when the oxyhemoglobin band disappears. The blood is titrated with a tartaric acid solution. [The method is extremely ingenious, but it is doubtful whether any of our present methods of determining the alkalinity of blood have any great scientific or clinical value.]

¹ Therap. Monatshefte, 1902, No. 9.

² Berl. klin. Woch., Nov. 24, 1902.

³ Wien. klin. Woch., Nos. 28 and 29, 1902.

⁴ Rif. med., 1902, No. 116.

⁵ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

⁶ Phila. Med. Jour., Jan. 17, 1903.

A. Jolles¹ describes a new apparatus and method for the **determination of the phosphorus** in the blood. The method is colorimetric, and depends upon the fact that potassium phosphomolybdate exhibits a definite color at a certain temperature. The method may be carried out with very small amounts of blood; and, according to the author, the results are comparable with those obtained with more elaborate and more reliable methods.

Schwenkenbecher,² in a study of colorimetric methods of determining the presence of iron, particularly in the blood, especially referring to Jolles's method, reaches the conclusion that there is, as yet, **no reliable colorimetric or spectrophotometric method** of determining the amount of iron. He believes that all the results that have been obtained by such methods are unreliable.

GENERAL CONSIDERATIONS.

F. Freymuth³ contributes some observations of great interest in relation to a large number of varieties of **obscure anemia**. He has made some experimental investigations concerning the **relation between mild infection and changes in the blood-producing organs**. This was done by injecting rabbits with a nonlethal dose of living typhoid bacilli, it being shown that such injections cause the production of agglutinins, amboceptors, and other specific substances, even when the clinical signs of infection are absent. Postmortem examination in such cases showed changes in the spleen, bone-marrow, and lymph-glands. The author used amounts of culture varying from $\frac{1}{10}$ to $\frac{1}{300}$ of an öse. He found **decided changes in the blood-building organs**; the most striking was that the bone-marrow, in place of the large cavities filled with fat, showed very marked cell-proliferation, the cavities being sometimes entirely filled with red marrow. There was also a marked increase in the mytotic processes in the cells; while the lymphoid cells of the bone-marrow showed marked increase, and there were many transition forms of this variety and of the polymorphonuclear leukocytes. The cells with giant-nuclei were also regularly increased. Even $\frac{1}{300}$ of an öse was often sufficient to produce distinct changes in the bone-marrow. The changes were often much less marked after large than after small doses. The general conclusion reached is that extremely small doses of bacteria, which may produce practically no clinical signs of infection, do have a specific effect upon the blood-building apparatus, exciting it to an abnormal degree of activity. With even moderate doses, the demand upon the blood-building organs is apparently sometimes so great that it cannot be met. In such cases the first function to fail is that of blood-regeneration. The probable importance of this in relation to many anemias and so-called chlorotic processes, in which a definite cause has not yet been discovered, is evident; and the author considers it extremely important, in such cases, to search

¹ Zent. f. innere Med., Jan. 31, 1903.

² Deut. Arch. f. klin. Med., Bd. lxxv, Hefte 3-5.

³ Deut. med. Woch., May 14, 1903.

with the utmost care for a possible local source of even the mildest infection, especially studying the respiratory, digestive, and genital tracts. [This paper is extremely suggestive and seems like an important confirmation of ideas that have previously been rather vaguely supported by facts. Clinical results of great importance may perhaps be reached by following this idea carefully.]

J. N. Hall¹ reports 2 cases of what he calls **chronic cyanotic polycythemia**. The first occurred in a woman of 61 years, who had had no previous serious illness. She had decided dyspnea with intense cyanosis and very much distended veins. The heart was slightly enlarged, but it could not be determined that the spleen was enlarged and glandular enlargement was absent. There was albuminuria and a few casts were found. The red cells numbered over 9,000,000; and the hemoglobin, at two estimations, 170 and 200. The other case was in a woman of 40, who had intense cyanosis and an enlarged spleen. She had no dyspnea, and the heart was negative. She showed from 8,400,000 to 9,935,000 red cells. The hemoglobin was between 160 and 170. The blood was extremely thick and would hardly flow. The superficial veins were enlarged and dark. In the first case the white cells were 6500; in the second they were at one time noted as 22,000, and at another as 6500.

A. Robin² discusses at length the condition that he terms **plasmatic anemia**, which he considers to be due to a loss of organic mineral combinations. He thinks that there exists in certain anemias a demineralization of the plasma, the loss being chiefly in sodium chlorid. The red cells diminish in number and in activity; the density of the blood decreases; and the solids, particularly the organic materials,—and especially organic mineral compounds,—become greatly decreased in quantity. The treatment of the condition should consist in the restitution of the minerals to the plasma; and, after this, in the use of iron. [The attempt to establish the existence of such a condition by such unscientific methods must be deprecated. Robin states that, owing to the difficulty of determining the balance of intake and outgo of the mineral substances, he avoided this procedure and merely determined the ratio between the output of urine, of total solids, of nitrogen, and of the mineral constituents of the urine. Such a method is more unscientific than is the much-talked-of ratio between urea and uric acid.]

Krebs and Mayer³ have made an elaborate study of the **effect of sweating upon the constitution** of the blood. Sweating for from 15 to 25 minutes in hot-air baths produced moderate leukocytosis, the polymorphonuclear neutrophiles being chiefly increased. Similar effects were produced by light baths. Hot-water baths produced no leukocytosis, the number of leukocytes being rather decreased. The therapeutic effects of sweat-baths are not due, the authors believe, to qualitative or quantitative changes in the blood, but to their influence upon the circulation and upon the tissues themselves.

¹ Amer. Med., June 27, 1903. ² Bull. de l'Acad. de Méd., Dec. 30, 1902.

³ Zeit. f. diätet. u. physikal. Therap., Bd. vi, Heft 7.

G. Kieseritzky¹ discusses the **effect of fasting** upon the blood. Four days' fasting caused **concentration of the blood** of a rabbit. Following this, when food was given, there was a marked hydremia. There was no evidence of destruction of the red corpuscles. The body-weight reached its previous amount more rapidly than the blood regained its normal condition. When the period of fasting was followed by a period of subnutrition, the concentration of the blood persisted. If proper nourishment was then administered, the regeneration of the blood proceeded very slowly.

E. Ekgren² discusses the **effect of massage** upon the blood-corpuscles, and reports a series of studies which indicate that general or abdominal massage causes a marked increase in the polymorphonuclear cells and a general increase in the number of leukocytes.

J. J. Curry,³ in a preliminary report concerning the **effects of altitude upon the blood**, states that with an increase in the number of red cells there is a proportionate diminution in the size of the individual cells, the "respiratory area" of the blood remaining practically the same at sea-level and at a high altitude. The hemoglobin-percentage remains the same, as does the value of the red cells as determined by the hematocrit, and the specific gravity is likewise unchanged. The relative number and the differential proportions of the leukocytes do not change.

C. Hirsch and C. Beck⁴ contribute some further observations concerning the **viscosity of living human blood**. With the methods they have previously described, they investigated the condition of the blood in 24 cases of nephritis, and found the viscosity increased in only 3 instances. In the other instances it was about normal or slightly decreased. Increased viscosity, therefore, in their opinion, cannot be the cause of nephritic hypertrophy of the heart. Since the enlargement in nephritis involves both ventricles, the changes in the vessels are not a sufficient explanation for the hypertrophy. The authors, therefore, believe that Bright was right in his statement that it is due to some substance acting directly upon the heart-muscle. The question as to the occurrence of increased viscosity in uremia they cannot answer finally; but in 2 instances they found it increased.

E. Fuchsig⁵ reports a case of **traumatic lipemia** that occurred in a girl of 17, who threw herself from the third story to the ground, with suicidal intent. She received multiple fractures; and next day she exhibited coma, fever, and spasms in the left facial territory and in the lower extremities. The urine contained albumin and hyaline casts, and many fat-droplets were found swimming on the surface. The same conditions persisted until the fourth day, when she died; though the albumin and casts disappeared from the urine on the last day. Necropsy showed slight intermeningeal hemorrhages, with extremely slight flattening of the convolutions of the brain. Histologic examination showed the presence of fat-droplets in the vessels of all the organs examined. The author

¹ Deut. Aerzte-Zeitung, 1902, Heft 4.

² Deut. med. Woch., July 17, 1902.

³ Amer. Med., Sept. 6, 1902.

⁴ Deut. Arch. f. klin. Med., Bd. lxxii.

⁵ Zeit. f. Heilk., 1902, Bd. xxiii, Heft 1; Abth. f. Chir.

considers that this condition should be called lipemia, rather than fat embolism.

P. Grützner¹ studied ticks after they had sucked blood from dogs, and found that their digestive tract contained a thick, dark-red mass, which had the color of reduced blood, and which microscopically was found to consist largely of beautiful hemoglobin crystals. These changes in the blood are similar to those which occur when the blood is preserved in capillary tubes and left for a long time.

J. B. Herrick² reports 5 cases in which **severe anemia was caused by repeated small hemorrhages**, the result of hemorrhoids. He insists that this cause of profound anemia is not sufficiently recognized; and that it may produce a very grave anemia, which may even prove fatal.

E. C. Jones³ reports a case of **secondary anemia** of the pernicious type, associated with marked jaundice, in which there was a rapid recovery. It occurred in a woman of 25 years. The symptoms at first seemed to be those of ordinary catarrhal jaundice; but the patient's condition grew progressively worse, and the red blood-corpuscles were at one time reduced to 772,333 and the hemoglobin to 20 %. Two months after this the red cells are noted as 3,031,250, and the hemoglobin as 65 %.

S. Talma⁴ reports 3 cases of what he terms **intraglobular methemoglobinemia**. He believes that in all 3 cases the cause of the condition was **intestinal intoxication**. He determined the presence of intraglobular methemoglobin by drawing a considerable amount of blood, if necessary, from a vein; standing it in a cylindric vessel in a cool place, but not on ice; and allowing the clear serum to separate. If the clot does not retract well, the examination cannot be made; as the methemoglobin is likely to be dissolved into the serum, and it cannot be determined that methemoglobin is contained solely in the corpuscles. The methemoglobin sometimes diffuses into the serum nevertheless; in this case, also, the examination is interfered with. In the first case the symptoms had lasted probably longer than a year. The man was taken suddenly ill with headache and giddiness. He rapidly became pallid and lost consciousness. The next day he was better, but had dyspnea, cardiac disturbance, and some edema. The feces were extremely offensive and were frequently passed. This man had methemoglobin in his corpuscles. The urine contained some indol and skatol. Routine blood-examination had no important results, except for showing over 32 % of lymphocytes. The patient exhibited increasing cyanosis. Treatment was not effectual. The second patient had been ill for about 2 years. He had had tropical malaria and bloody diarrhea, and also syphilis. When seen, his chief complaint was of weakness with dysenteric diarrhea. The third patient also had been ill for many months. He had intestinal disturbance, headache, and palpitation; and had lost strength. Both the second and the third patient had a **large amount of indican in the urine**. It was noted that in the third case the reaction for indican was peculiar, in that it was

¹ Deut. med. Woch., July 31, 1902. ² Jour. Am. Med. Assoc., Sept. 27, 1902.

³ Amer. Med., Aug. 9, 1902.

⁴ Berl. klin. Woch., Sept. 15, 1902.

positive in the fresh urine; while after the urine had been allowed to stand overnight, the reaction for indican was but slight. After the old urine had been treated with H₂S, the reaction was again very marked. This was thought to show the presence of some oxidizing substance in the urine that interfered with the reaction.

A. Stengel and C. Y. White¹ report a **remarkable case of acetanilid poisoning** with marked alterations in the blood. The patient, a woman of 25, had for a long time had severe dental neuralgia; and, after severe malaria, she became anemic and had a tendency to cyanosis and to syncope. When seen, she was **excessively cyanosed**, the heart's action was extremely weak, and there was a marked systolic murmur of mitral characteristics. The liver was somewhat enlarged and the spleen much so. In spite of the cyanosis, there was **no dyspnea, coldness, or edema**. Venesection relieved the cyanosis. Examination of the blood showed about 3,000,000 red cells and 19,800 leukocytes; and a subsequent examination showed about 2,000,000 red cells, with about **71,000 nucleated cells** and 35 % of hemoglobin. Of the nucleated cells, over 32,000 were nucleated red corpuscles, 91.4 % of these being normoblasts. There was great variation in the size and shape of the red corpuscles. The urine contained large amounts of oxyhemoglobin during the attacks. The patient was suspected of taking drugs, but for a long time this could not be proved. Finally, it was found that she had been secretly taking large amounts of acetanilid. A remarkable point about the case was the fact that the cyanosis came on in severe paroxysms, and that in the interval it practically disappeared. The case had previously been considered heart-disease by several diagnosticians; it had even been definitely diagnosed as patulous intraventricular septum.

R. C. Cabot² reports a case of **methemoglobinemia** in a man of 35, which was due to taking large doses of acetanilid for a long time. A striking point about the case was the **good general condition** of the patient. The blood was chocolate-colored; there was a slight leukocytosis; the polymorphonuclears were relatively increased; the red cells showed granular stippling and slight poikilocytosis, but no other abnormality. Methemoglobin was present in both the blood and the urine; hematoporphyrin was absent.

Uhlenhuth³ discusses his results from the practical use, for medico-legal purposes, of the **serum-diagnosis of the nature of blood**. He presents a series of results with blood of various kinds sent him by the Department of Justice, the department knowing the actual nature of the blood or being familiar with the results obtained at the trials of murder cases. The author states that his results regularly corresponded with the facts subsequently learned from the Department of Justice; and that, by this means, one can, with proper technic, carry out a **reliable determination of the origin of blood**. In order to do this, however, it is necessary to have a perfectly reliable technic. The activity

¹ Univ. of Pa. Med. Bull., Feb., 1903.

² Phila. Med. Jour., Nov. 29, 1902.

³ Deut. med. Woch., Sept. 11 and 18, 1902.

of the serum must have been determined beforehand; and it is well to have old specimens of blood, of various ages, at hand, in order to compare the blood to be tested with a known blood of about the same age. Uhlenhuth notes that there is occasionally obtained a serum which is very thick and has a milky, opalescent appearance. Such serums must not be used, as they are likely to give confusing results with closely related species of blood. He thinks that it is to the use of such serums that doubtful results with heterologous blood may be attributed. The test cannot be satisfactorily left to those who have no special skill in this kind of work; the serum must be produced and used by one who is well acquainted with the methods of work and with the possibilities of error.

M. Halpern¹ has made a **study of hemolysis** in a series of cases, with the view of determining whether it has any **clinical importance in diagnosis**. He investigated 30 cases of various kinds, and it was found that of a considerable variety of cases, typhoid fever and septicemia alone showed any distinct change in the hemolytic power of the blood-serum. In the first it was more marked, and in the second weaker than is normal. It is worthy of note that pernicious anemia and the morbus maculosus of Werlhoff showed no recognizable change in the hemolytic activity of the serum. [See also under "Uremia."]

Tarchetti and Rossi,² discussing the **value of cytodiagnosis**, report their observations upon 43 cases of pleural and peritoneal exudate. They find that in the transudates the chief cellular elements are endothelial cells. Small mononuclear cells are also present in large numbers. These are different from true lymphocytes and are **modified endothelial cells**. In pleural exudates that accompany acute pneumonic processes polymorphonuclear cells are found in largest numbers. In primary pleurisies, which are probably tuberculous, lymphocytes are usually found in largest numbers, though in some cases polymorphonuclear cells are most common; in rarer cases endothelial cells are most numerous. The lymphocytes found in these primary pleurisies are, the authors believe, true lymphocytes, and not regressive phases of changes in endothelial cells. There are exudates in which lymphocytes are most numerous, but in which there is no reason for believing that the disease is tuberculous. On the other hand, there are undoubtedly tuberculous exudates in which there are few lymphocytes, but many polymorphonuclear cells. The authors conclude that the value of cytodiagnosis is extremely limited, and that it is very rash to attempt to make a definite diagnosis of tuberculosis or to exclude that disease by this means [a conclusion that seems wise].

THE ERYTHROCYTES.

G. Lang³ discusses the **resistance of the red blood-corpuscles** to hypotonic sodium-chlorid solutions in carcinoma of the stomach. The resistance of the red corpuscles to hypotonic sodium-chlorid solutions has been determined to be increased in some diseases; and, among others,

¹ Berl. klin. Woch., Dec. 1 and 8, 1902. ² Gaz. degli Osped., No. 102, 1902.

³ Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

Janowsky believes that it is increased in carcinoma of the internal organs. Lang discusses the methods of determining the resistance to osmotic influences; and he decides that, of the **methods employed**, drawing the blood into an ordinary blood-pipet in the usual manner, but diluting with sodium-chlorid solutions of various strengths,—from 0.9 to 0.3,—is the best, the red cells being allowed to remain 5 minutes before beginning to count them. He also discusses a method of his own, which is not so practical, and which, he decides, is little, if any, better than the previously mentioned one. As a result of his studies, he states that the resistance of the erythrocytes to a reduction of the osmotic pressure of the surrounding fluid is **greater in carcinoma of the stomach** than in other diseases of that organ. He believes that this is probably **due to the toxemia** that occurs in carcinoma of the stomach, in which the blood becomes gradually accustomed to this toxemia and its resistance is, consequently, increased. The author believes that this symptom may appear relatively early, even before diagnosis by other methods is possible.

M. Veyrassat¹ has investigated the **resistance of the red blood-corpuscles in pernicious anemia** and in gastric cancer, using Chanel's method, in which the corpuscles are counted after the blood has been diluted in 3 solutions. Solution No. 1 contains 1 gram of sodium sulfate in 40 cc. of distilled water; solution No. 2 is half this strength; and No. 3 is one-third this strength. In normal persons, solution No. 1 destroys from 2 % to 10 % of the corpuscles; No. 2, 38 % to 45 %; and No. 3, 90 % to 95 %. In pernicious anemia the author found the figures for the 3 solutions to be about 4 %, 74 %, and 96 %. Secondary anemias, such as gastric carcinoma, showed figures for the 3 solutions like the following: 6 %, 23 %, and 73 %. Veyrassat decides, therefore, that **pernicious anemia is associated with a reduction in the resisting power of the corpuscles, while secondary anemia is accompanied by an increase in their resistance.**

E. Hedon² has made a study of the **transfusion of red blood-cells in an artificial serum**, the cells being repeatedly centrifugated and washed with salt solution. He finds that it is possible, by this means, to save the lives of animals after fatal hemorrhages, when apparently ordinary transfusion with artificial serum alone would be insufficient; and when the use of defibrinated blood would be dangerous. The transfused erythrocytes appear to be destroyed but slowly, if they are taken from an animal of the same species. If cells from another species be used, supposing them not to be toxic for the animal injected,—as, for instance, if the red cells of a dog be injected into a rabbit,—he found that the animal's life was saved; but that the red cells transfused were rapidly destroyed. In this case the fate of the animal depends chiefly upon the number of red cells injected and upon the intensity of the hemolytic changes.

J. C. Da Costa, Jr.,³ in a general discussion of **degeneration of the erythrocytes**, reaches the conclusion that, from a clinical point of view,

¹ Lyon Méd., 1902, No. 25.

² Arch. de Méd. exper., 1902, p. 297.

³ Amer. Med., April 11, 1903.

the earliest retrograde change is simple discoloration. Deformities in size and shape occur in many varieties of pathologic blood, the intensity being in direct relation to the severity of the infection. Megalocytosis is a graver sign than is microcytosis. Atypic staining means impairment of function. The prevalence of megaloblasts stamps the blood as pernicious, except in bothrioccephalus infection and in nitro-benzol poisoning. Granular basophilia, the author claims, indicates degeneration. He suggests that the experimental granular changes in the erythrocytes that occur after the administration of preparations of hemoglobin warrant a **doubt as to the wisdom of using such preparations** as substitutes for iron in the treatment of anemia.

Reitter,¹ in a contribution concerning **granulations of the erythrocytes**, reports his observations in advanced pulmonary phthisis. In 20 cases he discovered basic granulations of the erythrocytes. He was always able to find them, although their numbers varied largely, and at times it was very difficult to discover the granulations. The author does not consider basic granulation to be, of itself, a pathologic change; but he believes that when these granulations appear in large numbers they do indicate pathologic conditions.

P. Schmidt² discusses the question of the **origin of the basophile granules** in the red blood-corpuscles, and insists upon the correctness of the view that they are **evidences of regeneration**. He reaches this conclusion chiefly through the results of his examinations in a case of tropical malaria in which hemoglobinuria occurred after the use of quinin. The red cells were very greatly reduced. There were megaloblasts, normoblasts, poikilocytes, and polychromatophiles; but no basophile granulations. A week later, however, the general condition of the patient had greatly improved; while the blood condition showed no special change, except the appearance of great numbers of basophile granulations and the disappearance of the megaloblasts. The same relation of the basophile granulations to regeneration was observed later on in the same case, while blood-destruction was associated with a fall in the number of granulations. The polychromatophiles followed the same course, except that their numbers increased before the numbers of the basophile granulations. The author believes that these observations show that the basophile granulations were not due to degeneration of the protoplasm. He also states that he has repeatedly observed in malaria that the basophile granulations appear in large numbers only when convalescence has become distinctly established.

Vörner³ has made a study of **blood-plates in syphilitic subjects**. He agrees with Lorsdorfer that extremely numerous granules are to be found in the blood of syphilites, but he thinks that these are blood-plates. He does not believe large numbers of them to be characteristic of syphilis alone, since he has **found them numerous in several other conditions**. They are, however, found with striking regularity and in large numbers in syphilis. They are **chiefly dependent upon the**

¹ Wien. klin. Woch., No. 47, 1902. ² Deut. med. Woch., Oct. 30, 1902.

³ Deut. med. Woch., Dec. 11, 1902.

anemia. Lorsdorfer thinks that they persist as long as the disease is uninfluenced by syphilitic treatment, but that mercurial treatment causes them to disappear; Vörner thinks that they do not disappear until the anemia associated with the disease improves. They are apparently not the result of the syphilis itself, but of the anemia accompanying that disease.

THE LEUKOCYTES.

A. Wolff¹ describes a **method of studying living bone-marrow** that he has used with satisfaction. He particularly insists upon the importance of studying unstained specimens of bone-marrow and of blood. He obtains bone-marrow by making, with aseptic precautions, an incision down to the tibia or to the femur. He then separates the periosteum; and bores, with an ordinary drill, one or two holes in the bone. The openings may, if desired, be enlarged. He then removes small portions of the bone-marrow with a platinum öse, and closes the hole in the bone with a few drops of paraffin. The wound is closed with sutures. The operation may be performed in 2 or 3 minutes. There is, at times, marked hemorrhage during the operation, which causes blood to become mixed with the bone-marrow. This may always be prevented, however, if one applies an Esmarch bandage before beginning the operation. The author recommends Deetjen's agar-mixture as a medium for studying the bone-marrow. He states that in the bone-marrow of rabbits he has been able to observe **very marked movements in the amphophile myelocytes.** He insists that it is important to study the bone-marrow in various diseases, more particularly in infections, in order to determine the morphologic relations that it shows to infection.

M. E. Mendelson² has investigated the **influence of heat upon the movements** of the white blood-cells, and decides that there is a marked thermotactic influence upon the leukocytes, high temperatures attracting them. The influence of temperature is manifested at as low a point as 20° C., and was observed at as high a point as 39.5° C. The author thinks this is of much importance in explaining the **influence of fever upon the organism.**

W. Zangemeister and M. Wagner³ report a study of the **leukocytes in the blood of pregnant, child-bearing, and puerperal women.** They first investigated the condition of the leukocytes in nonpregnant women, and found that they varied from 4000 to 21,000, digestive leukocytosis being entirely excluded. The authors also studied the effect of menstruation, but were unable to determine definitely that any leukocytosis occurred at this period. The leukocytes showed the same variability in their number in pregnancy that they did in nonpregnant women, and the variations seemed to have **no definite relation to any abnormality** that could be discovered. During labor the leukocytes were increased as compared with conditions during pregnancy, and during the course of the labor the numbers increased at different counts. Early

¹ Deut. med. Woch., March 5, 1903.

² Russky Vratch, Jan. 25, 1903.

³ Deut. med. Woch., July 31, 1902.

rupture of the membranes was associated with high leukocyte counts; and it was determined that **severe pains cause the leukocytes to rise.** In the puerperium the authors found that when there was absorption of putrid lochia, the leukocytes rose; also when there were marked after-pains. Often there was no leukocytosis when the lochia were somewhat putrid. Mastitis, in 2 cases, caused a moderate rise in the leukocytes. Zangemeister and Wagner **do not believe that prognostic or diagnostic conclusions can be drawn** from a study of the leukocytes, even in the puerperium.

Blassberg¹ has studied the leukocytes in 60 patients who were the **subjects of suppuration** in various parts of the organism. The count in all these cases was made at the same time of day. The author decides that leukocytosis is customarily an accompaniment of suppuration. In surface suppurations it is but slight; but it is much more marked in suppurations in the interior. When an abscess is opened, the leukocytosis decreases, but not so rapidly as the temperature falls. Blassberg considers, however, that changes in the white corpuscles can be used, in diagnosis and in prognosis, and in determining upon operation, only to a limited degree. The other methods of deciding should be esteemed more important.

E. Sacquépéé² states that the alterations in the leukocytes due to infections frequently **persist for a long time after the disease** is past. Of 10 persons that had been successfully vaccinated, he found, 6 months later, that the leukocytes were normal in only 3. In the other 7, as well as in 10 persons that had had scarlet fever from 4 to 8 months previously and in 3 that had had the disease a year before, the leukocytes were still abnormal, there being a relative decrease in the polymorphonuclear cells and the lymphocytes, while the large mononuclear cells were increased in number.

Kurpujuweit³ has made a study of the **different varieties of leukocytes in various conditions**, and particularly refers to carcinoma of the stomach. Strauss and Rohnstein have stated that the average number of polymorphonuclear leukocytes is much higher than is normal in carcinoma of the stomach, while the average number of mononuclears is smaller. The author's figures do not at all support this view. He finds the polymorphonuclears to be about 10 % lower in a series of cases than did Strauss and Rohnstein. He reports a remarkable case of carcinoma of the stomach in which, at the first differential count, the large mononuclears constituted 3 %; and the large and small lymphocytes, 25 %. At a second count, carried out 6 hours before death, the **large mononuclears constituted 33 %**; and the lymphocytes, 35 %. The mononuclears were in part extremely large, some of them being twice as large as a normal polymorphonuclear. The necropsy confirmed the diagnosis of gastric carcinoma with numerous metastases. In the lymph-glands many large mononuclear cells were found, and apparently the same condition was present in the bone-marrow. This increase in the number of

¹ Wien. med. Woch., No. 47.

² Arch. de Méd. exper., 1902, p. 124.

³ Deut. med. Woch., May 21, 1903.

the large mononuclears was associated with clinical symptoms suggesting the occurrence of a severe intoxication, and this was followed by death. It seemed, therefore, that the abnormal increase in the large mononuclears was **due to this onset of intoxication**.

E. A. Locke¹ reports a series of observations that he has made concerning the **clinical value of the iodin-reaction** with the circulating leukocytes. He has used only the intracellular reaction in making up his statistics. He finds that **septic conditions of all kinds**, in which he includes pneumonia, tonsillitis, and gonorrhreal arthritis, **always show the reaction**; and that if the reaction is absent, such conditions may be ruled out. The reaction disappears in pneumonia directly after the crisis, if there is frank resolution; and it also disappears in pus-cases directly after drainage of the pus. Hence, the author believes that its persistence in pneumonia after the crisis indicates delayed resolution, abscess, or empyema. He considers the reaction to be a **very important one clinically**. He thinks that it is a more reliable indication of the severity of the infection than either the white count or the temperature. [This is not fully in accord with the experience of many others. It is not probable that a definite diagnosis or prognosis can be based on this reaction. The following abstract throws further doubt upon its value as an indication of any special form of disease.]

S. Kaminer² discusses the intracellular glycogen-reaction of the leukocytes. An extracellular iodin-reaction may occur; but it is not always seen in connection with the intracellular; and the author believes that it is probably artificially produced, and that it may be due to some extent to blood-plates. The conditions in which the reaction occurs are chiefly those **associated with fever, leukocytosis, and bacterial infection**; and the toxins of the streptococcus, the staphylococcus, *Bacillus pyocyaneus*, the diphtheria bacillus, the anthrax bacillus, the bacillus of Friedländer, the pneumococcus, the typhoid bacillus, and *Bacterium coli* produce the reaction, as do ricin, abrin, and diphtheria toxoid. Chronic infections, such as glanders and tuberculosis, may also produce the condition, but only when the organism has become generally invaded; and it does not occur even then in rabbits. Tetanus toxin, the toxin of the hen-cholera bacillus, and that of *Bacillus prodigiosus* do not produce the reaction. Typhoid fever does not produce it in human beings. Probably, therefore, it would be **of value in determining the presence of secondary infection** with staphylococci or streptococci; although, if there is marked general typhoid septicemia, it is probable that the **reaction might occur in typhoid fever**. It is, the author believes, an **evidence of degeneration**, and is due to changes in the bone-marrow that are not found normally. He has observed that when the reaction appears in isolated corpuscles in the circulation, one may find very many reacting corpuscles in the bone-marrow. The injection of substances that have a close affinity for iodin, such as silver nitrate and some oils, causes the reaction to appear in some cases, even when a

¹ Boston M. and S. Jour., Sept. 11, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

secondary infection and outspoken abscess-production are absent. He believes that his work indicates that the reason that the reaction occurs with leukocytosis is that it **occurs in many intoxications which are associated with a leukocytosis.**

C. G. Seligmann and L. S. Dudgeon¹ report a case of **hydatid disease that was associated with eosinophilia.** The patient, who had echinococcus of the liver, exhibited 57 % of eosinophiles in a total of 17,000 leukocytes. After operation, the eosinophiles gradually returned to the normal number.

CHLOROSIS.

F. Erben² presents a careful and elaborate study of the **chemical condition of chlorotic blood.** As a general result of his work, he states that the albumins are diminished on account of a reduction in hemoglobin. The relation of albumin to globulin is, however, normal. The **fibrin is increased.** Fat is increased in both the serum and the corpuscles. **Lecithin is decreased** in the total blood and in the serum, and increased in the erythrocytes. **Cholesterin is decreased** in both the serum and the erythrocytes. Phosphoric acid, potassium, and iron are decidedly reduced; calcium and magnesium, increased. There is an **apparent increase in sodium chlorid**; but this is only apparent, and is dependent upon the relative increase in blood-serum. These results are **of interest in relation to the two theories of the origin of chlorosis.** As to the theory of increased blood-destruction, the decrease in lecithin and phosphoric acid in the serum speaks against this, because these substances are important components of the erythrocytes; if the latter were destroyed in abnormal numbers, their components should be found in large quantity in the serum. The same reasoning may be used in connection with iron. This was not found in quantitatively determinable amounts in the serum. The fact that the erythrocytes were poor in extractives **speaks against their destruction in abnormal numbers.** The increased amount of potassium in the serum and the increased amount of fat in the corpuscles might be considered to indicate increased blood-destruction; but these conditions, Erben thinks, may be readily explained upon other grounds.

H. Landau³ has made an extensive study of the **behavior of iron in the organisms of man and animals**, reviewing the literature and reporting some microscopic and chemical experimental work. He decides that inorganic iron is absorbed in the digestive tract in small amounts, the absorption occurring exclusively in the duodenum. The iron is received into the lymph-vessels and the blood-vessels, and deposited chiefly in the spleen, but partly in the liver and bone-marrow; and in the latter organs probably as an organic combination. Only in cases of marked destruction of the red blood-cells is iron deposited in the liver in the form of a loose combination, which greatly increases the iron-content of that organ. The excretion of iron occurs chiefly through

¹ Lancet, June 21, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 3 u. 4.

³ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

the lower bowel and very slightly through the kidneys, unless the amount of iron in the body is much increased. The addition of inorganic iron to the usual food of rabbits increases the iron-content of the liver and spleen decidedly. The addition of inorganic iron to artificial iron-free food increases the iron-content of the animals so fed decidedly, but not to the point that is reached with normal iron-containing food; and the animals do not develop as well as those normally fed. The author considers that the action of inorganic iron-preparations in anemic conditions is not due to their stimulating effect upon the blood-building organs, but to a **direct action, the iron being actually used** in the production of hemoglobin and in the manufacture of red blood-cells.

E. Biernacki¹ gives an extended discussion of the effect of iron in anemias, and reaches the conclusion that iron is useless and likely to be **harmful in all cases except those of true chlorosis of puberty**. Those persons that have a more or less anemic look, and are usually neurotic, but have no determinable hydremic condition of the blood, are commonly damaged, rather than improved, by the use of iron; and there is no reason for employing this drug in such cases except tradition. In chlorosis only large doses of inorganic iron are, in the author's opinion, satisfactory. Chalybeate mineral waters, he thinks, do little good. [This view concerning anemias other than true chlorosis is extreme, and is not well supported.]

Thébault² considers **arrhenal** an excellent preparation for cases in which arsenic is indicated. He believes that it has a much more rapid action than cacodylic salts or Fowler's solution. Unfavorable collateral effects are due to impurities.

PERNICIOUS ANEMIA.

E. Rosenqvist³ contributes an extensive article on **nitrogen metabolism in pernicious anemia, with special consideration of bothriocephalus anemia**. The study was carried out in Helsingfors, which explains the fact that the author had an opportunity to make metabolic studies of 21 cases of bothriocephalus anemia; he also investigated 3 of cryptogenic pernicious anemia. The cases of bothriocephalus anemia were undoubtedly due to that parasite, and were all cured by ridding the patient of the parasites. One case recovered from an anemia so marked that the red corpuscles were reduced to 410,000. There was a marked difference in the nitrogen metabolism before ridding the patient of the parasites and after the treatment; before treatment there was a **marked excitation in the destruction of nitrogenous tissues**, but after the treatment all the patients showed a marked nitrogen retention. There was, then, no question that the bothriocephalus had produced a **toxic increase in nitrogen metabolism**. It was notable, however, that in certain periods, even when the parasites were still present, the patients

¹ Wien. med. Woch., May 2, 9, and 16, 1903.

² Bull. gén. de Thérap., Aug. 30, 1902.

³ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

exhibited nitrogen retention; and Rosenqvist lays particular stress upon the fact that the **destruction of tissue in this disease is periodic**—an observation that is in accord with the general clinical observation that the disease progresses periodically. He also considers it of importance that after successful treatment he has repeatedly observed that the tissue-destruction continues for a time; but it is soon replaced with retention. He insists that it is important to recognize this fact, in order that patients may not be persistently treated with vermifuges after the parasites have all disappeared. As soon as the circulating poisons have been excreted or destroyed, the improvement continues smoothly. There was no direct relation between the destruction of tissue and the condition of the blood; but, in general, with improvement in the condition of the blood there was nitrogen retention, and vice versa. This lack of definite correspondence the author also considers of importance, as it indicates that temporary lack of progress in the anemia does not necessarily indicate that the parasite has been got rid of and that the patient is free from toxemia. Metabolic studies may, at the same period, show the direct contrary. It also does not indicate that the periods of improvement in the blood are due to a lack of toxemia. It rather indicates that the **toxemia is somewhat paroxysmal in its effects**. The author believes that this is due to the **production of a temporary relative immunity**. Cryptogenic pernicious anemia showed the same destruction of nitrogenous tissue, exhibited in the same paroxysmal form, and sometimes temporarily replaced with nitrogen retention. Rosenqvist thinks that since it has been rendered practically certain that bothriocephalus anemia is a toxic anemia, the similarity between this condition and cryptogenic pernicious anemia from the metabolic standpoint indicates that **cryptogenic pernicious anemia is also definitely a toxic condition**. He also contributes some work concerning the purin metabolism in pernicious anemia, having determined both uric acid and total purin nitrogen. He finds that in both bothriocephalus anemia and pernicious anemia there is the **same periodic increase of purin metabolism** as was noted in connection with general nitrogen metabolism.

W. Hunter¹ discusses the nature and the etiology of pernicious anemia on the basis of 25 new cases. He insists that **Biermer's anemia and essential progressive pernicious anemia are not the same condition**; that **Biermer's anemia includes a heterogeneous group**, while true pernicious anemia is a disease that has a special nature and etiology. This is indicated chiefly by the marked tendency to hemolysis; and also by the occurrence of a **peculiar glossitis**, which is associated with a deep-seated, pure streptococcal infection of the substance of the tongue. The author gives a series of analyses of the percentages of iron in various organs; and finds that in pernicious anemia the percentage is always very much higher than it is in the anemias of severe sepsis, gastric cancer, and other similar conditions. He believes that this demonstrates that in pernicious anemia there is a **peculiarly marked degree of hemolysis**. He thinks that it is a **septic condition**, but that its distinction from

¹ Lancet, Feb. 7, 1903.

other septic conditions is in its peculiar tendency to cause severe hemolysis. The **infection usually takes place through the tongue**, he believes, but sometimes in the intestinal tract. It is extraordinarily persistent. Hunter objects to the statement so often made that he attributes pernicious anemia to bad teeth, foul mouth, and such conditions. These conditions occur in the disease, but he thinks that they are merely a part of the indications of a specific infectious disease.

L. Syllava,¹ in discussing the question of the **nature of pernicious anemia** (viz., whether due to excessive hemolysis or to imperfect hemogenesis), mentions his investigations of the blood-serum of 5 cases. In the first of these, in which there was marked icterus, the serum was of a clear ruby-red, and contained hemoglobin and bilirubin. In the 4 other cases, in which there was a slight icteric tinge, the serum was golden yellow, the color being more marked than that of normal serum; it contained no hemoglobin, but did contain bilirubin. Hemoglobinemia indicates increased destruction of red corpuscles. It is a primary phenomenon, and not merely a secondary occurrence; because the changes in the hematopoietic organs appear much later, if they appear at all. In the first case mentioned the destruction of red cells was evidently more marked than in the other four. This patient did not exhibit a more rapid course, apparently because of rapid regeneration. The author considers that **excessive hemolysis is the primary factor** in pernicious anemia.

A. S. Warthin² discusses the **pathology of pernicious anemia**, contributing clinical and pathologic notes of 8 cases, and laying special stress upon the **condition of the hemolymph nodes**. He concludes that pernicious anemia is **essentially a hemolytic disease**, the hemolysis being due to **some unknown poison that stimulates the phagocytes** of the spleen, of the lymph-glands and the hemolymph-glands, and of the bone-marrow to increased hemolysis. It is not improbable that the destruction of hemoglobin produces hemolytic poisons. The hemolysis of pernicious anemia is not confined to the portal area, but also takes place in the prevertebral lymph and hemolymph nodes and in the bone-marrow. In most cases the spleen is the chief seat of the blood-destruction. No evidences of hemolysis were found in the liver, stomach, or intestinal capillaries in any of the 8 cases. The varying pathologic conditions found in his cases lead the author to state that it must be a **cyclic or an intermittent process of hemolysis**—a fact that is in consonance with the clinical observation that exacerbations are frequently seen. The changes in the hemolymph glands constantly found are dilation of the blood-sinuses; evidences of increased hemolysis; in some cases great increase in the size and number of the hemolymph glands. The **changes found are not specific of pernicious anemia**. The lymphoid and megaloblastic changes in the bone-marrow the author considers to be of compensatory nature, and not an essential part of the pathology of pernicious anemia.

H. Strauss,³ discussing the **relation between pernicious anemia**

¹ Zent. f. innere Med., 1902, No. 45 p. 1122. ² Am. Jour. Med. Sci., Oct., 1902.

³ Berl. klin. Woch., Aug. 25 and Sept. 1, 1902.

and the digestive tract, refers to the richness of the gastrointestinal mucous membrane in lymphocytes in this condition. He believes that this is less an evidence of the location of the disease in these organs than of the involvement of the lymphatic apparatus of these organs. To demonstrate this point, he reports his observations in a total of 10 cases. He found an increase in the number of lymphocytes in the wall of the stomach in all but one case; while, on the contrary, there was practically no evidence of any disease of the stomach or of increase in the connective tissue in most of the cases. It was, therefore, **not a special change in the stomach**, but a part of a general involvement of the lymphatic tissues; and it was not a part of a chronic inflammatory condition. It was, rather, **analogous to the changes found in the bone-marrow**. The author has also noted the influence of artificial coprostasis upon the blood in rabbits, and has found no marked or characteristic changes in the blood. He believes that there is **no definite evidence that artificial obstipation can produce anemia**. He has also studied the hemolytic power of the blood-serum of constipated persons, and compared it with that of the serum of normal persons, without finding any definite differences. He positively insists that **no relation between gastrointestinal disease and pernicious anemia** has been established, though in some cases the observations have been very suggestive. [This practically states the case: there are interesting possibilities, but no definite facts.]

M. Einhorn¹ reports a case of achylia gastrica and some cases of pernicious anemia, with especial reference to the relation between these two conditions. He **does not believe that pernicious anemia is produced by atrophy of the stomach**, because in most cases of achylia gastrica the blood is nearly normal. In one case that he observed at autopsy total atrophy of the stomach was found, but pernicious anemia had not been present. Gastric juice is occasionally found to be secreted in pernicious anemia.

H. Adler² discusses the relation between pernicious anemia and achylia gastrica, reporting 3 cases, 2 of them fatal. He agrees with the view that the **anemia is secondary to the gastrointestinal atrophy**, and considers that it is due to the production of some toxic hemolytic substance in the gastrointestinal tract.

F. Billings³ discusses the **changes in the spinal cord and the medulla** that occur in pernicious anemia, and states that within a few years he has had under observation 41 cases of pernicious anemia—23 in males and 18 in females. Paresthesia occurred in 40 cases; in 27 there were subjective disturbances only. In 11 patients there was a spastic, usually also an ataxic condition, which grew steadily worse; in 3 there was ultimately complete flaccid paraplegia, with loss of knee-jerk and of bowel and bladder control. **Girdle-sensation was present** in all the cases that developed spasticity. In some patients the **peculiar paresthesia of the mouth** described by Putnam was present. Sexual power was uniformly diminished in the males. After discussing the conditions in the central

¹ Med. Rec., Feb. 28, 1903.

² Amer. Med., Nov. 15, 1902.

³ Chicago Med. Recorder, Jan., 1903.

nervous system, the author states that it is **probable that the changes are produced by a toxin**, which may in one instance have a special tendency to cause hemolysis; in another, to cause degeneration and sclerosis of tissue; and in still another, to cause both. He thinks that it is most probably of gastrointestinal origin. The diffuse degenerations of the cord that occur without pernicious anemia, he thinks, have no essential difference from those that occur in pernicious anemia.

Senator¹ demonstrated to the Berlin Medical Society blood preparations from a **child 10 months old** that had rachitis and marked anemia, without swelling of the lymph-glands, spleen, or liver. The red cells were greatly reduced in number; the hemoglobin was also disproportionately reduced; there were microcytes, macrocytes, and poikilocytes, and occasional mitoses. The white corpuscles were not notably increased in relative number; but the lymphocytes constituted 73.5 % of the total. Leukemia, pseudoleukemia, and the pseudoleukemic anemia of infants could apparently be excluded; and the condition was called pernicious anemia. The child died. Pernicious anemia is very uncommon in such young children.

P. Reckzeh² reports 5 cases of pernicious anemia and gives a general discussion of the etiology and the diagnosis of the condition. He agrees with Strauss and Rohnstein that the **lymphocytes are present in abnormally large number**, and that this is of diagnostic importance.

LEUKEMIA.

A. Wolff³ discusses the **importance of the lymphoid cells in the production of blood**, largely from an argumentative standpoint. His conclusions, drawn partly from observations and partly from theory, are that the principal points which have been used to differentiate between lymphocytes and granulocytes are not supported by the most recent investigations; for lymphocytes have been found with granules, they have been noted to have movement, and an active lymphocytosis probably occurs. There is a cell that can be differentiated from the lymphocyte, and which Michaelis and Wolff have called the **indifferent lymphoid cell**. The latter believes that the various organs of the hematopoietic system undergo, under normal circumstances, a differentiation of labor, the bone-marrow producing granulocytes, the lymph-glands lymphocytes, and the spleen large mononuclear cells, the spleen being also actively engaged in phagocytosis. In all these organs, however, indifferent lymphoid cells may be found; and the author believes that the **organs can act vicariously in case of necessity**. He thinks that a **myeloid function of the spleen has been determined to occur**, and considers that the indifferent lymphoid cells furnish the various cells in the circulating blood, including the erythrocytes. He also thinks that he and Michaelis have proved that the two main types of leukemia may become transformed each into the

¹ Deut. med. Woch., Feb. 12, 1903; Ver.-Beilage, p. 52.

² Berl. klin. Woch., July 21 and 28, 1902.

³ Zeit. f. klin. Med., Bd. xlv, Hefte 5 u. 6.

other. The curious large lymphocytes found in enormous numbers in cases of lymphemia, they consider to be stages in the development of lymphoid cells. They, therefore, make another type of leukemia, which they call lymphoid-cell leukemia. Leukemia is not tumor-formation with metastasis, but a **metaplasia of the hematopoietic organs**.

A. Wolff¹ also reports a case of fatal lead anemia with necropsy, particularly referring to the fact that a microscopic examination of the spleen showed the presence of a large number of granulated cells, many of which seemed to be neutrophile myelocytes; and a number of which were certainly eosinophile myelocytes. The latter could not be mistaken. Myelocytes could not be positively demonstrated in the lymph-glands, and were not found in the circulating blood. In these observations the author believes that he has demonstrated that the **spleen in this case took upon itself a myeloid function**. He thinks that this observation is of decided importance in the general pathology of disease of the hematopoietic system, since he considers it to demonstrate that a myeloid change, in the sense of a **metaplasia, may occur, even in the absence of leukemia**. He thinks that this shows that the Ehrlich school was wrong in stating positively that the leukemic changes are metastatic. He believes it to be entirely possible—and, indeed, probable—that they are metaplastic.

A. Pappenheim² gives a long discussion of the newer questions in the realm of hematology. He states at length his own views concerning the **origin of the blood-cells, referring them all to the bone-marrow** for their source; and considering them all to arise from an original type of mother-cell, from which the others are derived. He believes, however, that the different cells are entirely distinct, and that none of them are stages leading to the formation of the others. The greater part of his paper is devoted to leukemia. He insists that the relation of leukemia to pseudoleukemia and that of these diseases to the hematopoietic system may be properly stated as follows: **Pseudoleukemia is often the preliminary stage of a lymphatic leukemia**. The development of leukemia is dependent upon the occurrence of disease in the bone-marrow. In lymphocytic leukemia, then, there are two types of cases: (1) the ordinary type, in which there are pseudoleukemic changes in the glands, followed by changes in the blood; and (2) cases without changes in the glands, in which there are, in the early stages of the disease, **changes in the bone-marrow, and subsequently blood-changes**. Mixed-cell leukemia is primarily dependent upon bone-marrow changes. These are followed by blood-changes, and perhaps ultimately by changes in the glands. This description differs from the view of Ehrlich in that Ehrlich believes that lymphatic leukemia is due to the gland-changes; and that these are followed by the blood-changes, and perhaps ultimately by a lymphadenoid change in the bone-marrow. Pincus' modifies Ehrlich's view by attributing the ordinary cases to gland-changes that cause the blood-changes and may eventually be associated with changes in the marrow, but making also a second class of those cases in which there

¹ Berl. klin. Woch., Sept. 8, 1902. ² Zeit. f. klin. Med., Bd. xlvi, Hefte 3 u. 4.

are no glandular tumors. In these latter cases he considers that there is a lymphoid change in the bone-marrow that produces the blood-changes. [This whole question is largely in the realm of speculation and personal opinion. It is possible that the study of lymphotoxins and myelotoxins will help to solve it.]

B. Chmelar¹ discusses the etiology of leukemia, and insists upon its **etiological relation with infectious diseases.** He considers that the disease is not due to any specific microorganism, but that it arises under the influence of various acute and chronic infections that cause excessive hyperplasia of the lymphoid elements. He reports a series of cases to substantiate this view.

Menzel² demonstrated to the Medical Society of Vienna **leukemic changes in the larynx and in the antrum of Highmore**, observed during life. The laryngeal changes were visible as two symmetrically arranged, grayish-white, flat swellings, with smooth, convex surfaces, lying below the vocal cords. The changes in the antrum consisted in nodules as large as the head of a pin. The histologic examination of these and of the laryngeal masses showed that they were purely leukemic deposits.

H. Quincke³ reports 2 interesting cases of leukemia that **showed, as a terminal complication, miliary tuberculosis.** In both cases the tuberculosis was a fresh infection; in both it was noted that with the onset of the tuberculosis there was an extremely striking reduction in the number of leukocytes and in the size of the spleen, and it could only be considered that the leukocytes and large portions of the spleen had undergone destruction. At the same time, there were found in the blood large numbers of granules, which were probably the product of leukocytic destruction. The blood also had, at the end of life, the characteristics of hydremic, rather than of leukemic blood. The author notes, however, that there are on record cases of miliary tuberculosis in which no influence was exerted upon a coincident leukemia. He also describes a case of pseudoleukemia in which acute miliary tuberculosis occurred, and in which a similar hydremic condition of the blood with a remarkable reduction in the size of the spleen occurred at the end of life. As a result of these observations, he tried **tuberculin-injections in the treatment of leukemia.** The results have already been partly published by Henck. They were of somewhat doubtful importance, but could not be carried far; and the cases were not very satisfactory ones for the use of this treatment. Quincke recommends its further trial.

W. Murrell⁴ describes a case of leukemia terminating in tuberculosis. The points of interest are the **fall in the leukocytes toward the end**, the highest count having been 220,000, that taken 6 weeks before death having been 167,000, and that just before death 16,200; and the fact that toward the end the myelocytes also fell very markedly, the highest count

¹ Wien. med. Woch., March 7, 1903.

² Zent. f. innere Med., Nov. 29, 1902, p. 1203.

³ Deut. Arch. f. klin. Med., Bd. Ixxiv, Hefte 5 u. 6.

⁴ Lancet, July 19, 1902, p. 152.

having been 44 %, and the lowest 7 %. During the last 2 months of life, also, the patient had had many extensive hemorrhages.

J. V. Drozda¹ reports a remarkable case of acute leukemia. The patient, 12 years of age, was taken sick with violent headache. He afterward had severe dyspnea, blood-extravasations, and the general clinical and hematologic signs of acute leukemia. At the postmortem examination there was found an enormous hyperplasia of almost all the adenoid tissue, particularly along the digestive tract; and a **massive growth on the outer side of the dura mater**. Only one case showing a condition similar to the last-mentioned change was found in literature, and this was an instance of chloroma. The spleen was but little involved. The case was considered to be an intermediate stage between acute leukemia and lymphosarcoma, and was termed leukemic sarcomatosis.

J. B. Nichols² reports 2 cases of acute leukemia, one in a boy of 14, and the other in a man of 22 years. He also gives an extensive and useful review of the literature of the subject.

W. Turk³ demonstrated to the Vienna Medical Society the preparations from a case of **acute myeloid leukemia, with green discoloration of the bone-marrow** and of other leukemic infiltrations. The clinical picture resembled pernicious anemia, the red blood-cells having been reduced to about 1,000,000, and the hemoglobin to 19 %; but the red cells did not show very marked morphologic changes, and there were no nucleated red cells. The leukocytes, also, were increased to over 42,000; and 47 % of these were myelocytes, and at least 32 % were polymorphonuclears with neutrophile granulations. Only 14.75 % were lymphocytes, and these were of the ordinary varieties. Eosinophile myelocytes were seen in small number; ordinary eosinophiles were very rare. Mast-cells were not found. There was no fever. The general clinical appearance was not that of pernicious anemia; but a second blood-examination, undertaken 2 days later, showed a reduction of the red cells to 583,000, of the hemoglobin to 14 %, and of the leukocytes to 36,500. Necropsy showed diffuse grass-green discoloration of the bone-marrow in the vertebrae, ribs, sternum, and the proximal parts of both the femurs. The diagnosis was at first chloroma; but smears from the bone-marrow showed that the whole marrow was composed almost exclusively of neutrophile myelocytes and their derivatives. The diagnosis was then considered to be myelogenous leukemia. Sternberg considered that in the case of chloroma that he had demonstrated a year previously an analogous blood-condition had been found. The changes in the marrow, he believed, appeared to be peculiar only because, as a rule, the marrow is examined only in sections, and not in smears. Türk considered, on the contrary, that the conditions of the blood in his case could not be explained without considering leukoplasic myeloid hyperplasia to be present. In Sternberg's case most of the large mononuclear elements were the large lymphocytes that are seen in acute leukemia and in lymphosarcoma. The case presented he considered to be one of green myeloid hyperplasia.

¹ Wien. med. Woch., Feb. 28, 1903.

² Amer. Med., May 23, 1903.

³ Zent. f. innere Med., March 28, 1903, p. 336.

M. Weinberger¹ demonstrated to the Vienna Medical Society preparations from the blood and tissues of a case of **chloroma**. The blood was characteristic of acute lymphatic leukemia. The deafness and the youth of the subject suggested chloroma; but the characteristic symptoms, exophthalmos and swelling in the occipital and temporal regions, were absent. The respiratory gas-interchange was normal. The urea-excretion was somewhat increased, and also the uric-acid excretion; and the specific gravity of the blood was 1047. Necropsy showed the presence of a chloroma, with widespread hyperplasia of the lymphatic apparatus, in the form of greenish hyperplasias and nodules. The author considers the **green discoloration of chloroma an entirely accidental fact** that is likely to occur in all cases of lymphomatosis, whether they are leukemic or pseudoleukemic or are of the character of malignant lymphosarcomatosis. Türk agreed that it is impossible to make definite distinctions between acute leukemia and lymphosarcomatosis; while Sternberg insisted that the two conditions may be distinguished anatomically, and that chloroma is lymphosarcomatosis, and not leukemia.

W. Rosenblath² reports **2 cases of chloroma**. Both occurred in young persons, and in both the disease was fatal within a few months. The symptoms present were enlargement of various glands, protrusion of the eyeballs, hemorrhagic diathesis, and leukemic blood-changes. Autopsy showed a great many tumors, of greenish color, partly found as diffuse infiltrations into organs and partly as well-limited nodules. In both cases masses were found in the orbits. In one case the bone-marrow was puriform; in the other, reddish. In both cases it showed lymphoid change. The blood showed a marked lymphocytosis. The author believes that **chloroma can be satisfactorily diagnosed during life**, the diagnosis depending upon the signs of lymphatic leukemia associated with widespread tumors, which occur particularly about the head and in the cavities of the skull. An especially important symptom is exophthalmos, which is usually accompanied with severe pain. The author also reports a case of acute leukemia. In discussing the possible transformation of pernicious anemia into leukemia, he reaches the conclusion that as yet there is no evidence that this occurs. W. Risel,³ in a detailed description of the microscopic and macroscopic appearances in one of Rosenblath's cases, reports that the tumors belonged to the group of lymphosarcomas. The relation of the condition to leukemia he considers inconstant, and the origin of the disease entirely in doubt. The **cause of the green coloration is not clear**, but it is due to corpuscular elements.

L. R. Sutherland⁴ describes a case of chloroma which during life was considered to be leukemia. Autopsy showed numerous green masses, the color of which was most marked along the spinal column and in the substance of the lymph-glands. In these regions the color was practically grass-green; in other areas it was yellowish-green. The color gradually faded, as the parts were exposed to the air and the light; and on the day following the necropsy it had entirely disappeared.

¹ Zent. f. innere Med., 1903, p. 383.

³ Ibid.

² Deut. Arch. f. klin. Med., Bd. lxxii.

⁴ Scottish M. and S. Jour., Aug., 1902.

PURPURA.

H. L. Gordon¹ reports a remarkable case of purpura in a boy of 14, the disease having begun with stiffness of the joints and rash, on February 22, and having continued under his observation, with some improvement, until far into May. Some of the symptoms persisted even for months after this. The condition of the boy was not known at the time of the report. Some of the remarkable points about the case were the **constant continuance of the symptoms** during this time, without intervals of freedom; the prominence of skin-eruptions other than the purpuric eruption; the presence of **evanescent localized edemas**; the occurrence of **a cardiac complication**; and the appearance of **quite marked and persistent chorea** late in the course of the condition. There were also severe and repeated attacks of **abdominal colic**.

R. Wallace² reports a case that he terms **angioneurotic purpura**, the patient, a girl of 15 years, having for 5 years been subject to attacks in which widespread purpuric spots became visible and the **limbs and face became edematous**. There were also hemorrhages from the mucous membranes. In the attack described the spleen enlarged; and there were **colicky pains in the abdomen**, with vomiting. The red blood-cells were reduced to 1,376,000; the hemoglobin, to 20 %. A few normoblasts and several megaloblasts were seen. The blood clotted very rapidly upon being exposed to the air.

R. S. Wells³ discusses a case of purpura in which there were **hemorrhages from the stomach and the bowels**, and from the urinary tract; and in which there was also severe abdominal colic.

SCURVY.

J. E. Talley⁴ reports a case of **scurvy with unusual poverty of the blood**. The patient was a man of 32 years that had been in Cuba and in very unfavorable hygienic conditions. The blood-examination showed 370,000 red blood-corpuses, 17 % hemoglobin, and 4600 white blood-corpuses. The man died suddenly of syncope. The author refers to the blood-conditions in scurvy, and states that there is no characteristic condition of the blood. He finds that gingivitis is not a constant symptom. The blood may resemble that in pernicious anemia.

HEMOPHILIA.

E. A. Sadler⁵ contributes some notes on a **family of bleeders**, in the second generation of which there were 8 boys and 5 girls. Three of the boys were characteristic bleeders, 2 having died of hemorrhage; and a fourth was a cripple from hemophilic disorganization of the knee-joint. The daughters have had 15 children, 2 of them being girls that died in

¹ Lancet, Feb. 14, 1903.

² Lancet, March 28, 1903.

³ Amer. Med., April 18, 1903.

⁴ Jour. Am. Med. Assoc., Nov. 1, 1902.

⁵ Birmingham Med. Rev., Dec., 1902.

early infancy. Of the 13 boys, 9 have shown a tendency to bleeding. Three of these died when under 2 years of age. Of the 4 boys that have not shown a tendency to bleeding, 2 died in the very early days of life.

SPLENIC ANEMIA.

W. Osler,¹ in discussing the condition commonly termed splenic anemia, insists upon his belief that there is a special disease that is sufficiently distinct to deserve this name. It is a condition of unknown etiology and of chronic course, showing as its chief signs splenic enlargement, anemia of secondary type, hematemesis, and, late in its course, jaundice, ascites, and other signs of cirrhosis. The initial stage corresponds with "primitive splenomegaly"; the final stage with "Banti's disease." Osler thinks this condition distinct from the splenic enlargements that occur in malaria, syphilis, hepatic cirrhosis, leukemia, and other previously recognized conditions. The hematemesis of splenic anemia he considers to be a feature peculiar to this disease in that it is dependent upon the condition of the spleen and is not, as in alcoholic and syphilitic cirrhosis, due to the condition of the liver and general portal system. The various explanations that have been offered for this hematemesis are considered. The disease occurs chiefly in young adult males. The chief features of the anemia are the tendency to leukopenia, the fairly constant and usually disproportionate reduction of hemoglobin, and the fact that the red cells are often but little reduced in number. Pigmentation of the skin is a frequent and striking feature of the later stages. A large series of cases is reported. [The more generally accepted view is rather that under the term splenic anemia we group not cases of one peculiar disease, but a number of different disorders that have the common features of striking splenic enlargement, anemia, and absence of a well-defined cause of such abnormalities.]

J. Barr,² in a clinical lecture on 3 cases of Banti's disease, one of which had the interesting complication of erythromelalgia, draws attention to some common points in these cases. All were in men, whose ages varied from 38 to 48. Each patient had had a more or less serious accident to his abdomen some years before the occurrence of the disease. None had had syphilis, but one had been moderately excessive in the use of alcohol. The blood-pressure was low in all the cases. In all, there was evidence of a slow chronic peritonitis. In all, the spleen had become firm in the latter period of observation, and was undoubtedly becoming fibroid. In the latter period of observation the red cells, in all, had increased from below normal to at least 5,000,000; in one case, to 7,000,000. This, the author believes, was due to the fact that in the beginning of the disease hemolysis in the spleen is increased. As the function of that organ is gradually destroyed, hemolysis becomes reduced below the normal. Barr thinks it probable that the primary reduction would end in the presence of an excessive number of red cells, if the patients could live long enough. [No good reason is given for these

¹ Am. Jour. Med. Sci., Nov., 1902.

² Lancet, Aug. 23, 1902.

statements. The opinion of the majority leans to the view that the changes in the spleen are merely a part of a general disease, and not the direct cause of the blood-changes.] He believes that the disease is probably due primarily to vasomotor paresis of the splanchnic area, resulting from disease of the sympathetic ganglia. In treatment, therefore, he recommends measures that will raise the blood-pressure, improve nutrition and keep the intestinal tract as free from infection as possible. He is using suprarenal gland in two of the cases. In one, drainage of an abdominal effusion was carried out, and ultimately caused great improvement in the patient. He thinks that this is simpler than epiploectomy. [The theory as to the origin of the condition is one that cannot well be proved or disproved. Most observers feel little doubt, however, that some form of toxemia is the cause; and also that no one theory will explain all the cases.]

J. E. Talley¹ reports the case of a woman of 34, who had had dysentery, malaria, and mitral endocarditis some years previously. She had also had repeated attacks of epistaxis. Five years before, the spleen was known to have been moderately enlarged. Her second pregnancy terminated prematurely, during a febrile attack. There was no sign of puerperal infection. At this time the enlargement of the spleen increased to a very striking degree. The liver was not enlarged. There was no jaundice and no glandular enlargement. The urine was normal. The spleen gradually decreased in size. The red cells, at different counts, varied from 1,960,000 to 3,800,000; the leukocytes, from 3800 to 12,200. The differential count was about normal.

H. P. Hopkins and C. G. Seligman² report a case of acute splenic anemia that terminated fatally with general bacterial infection. The patient's illness had begun in January, 1902, with pneumonia, and he never regained good health after this time. Symptoms of splenic anemia rapidly developed, and he died in April. The most striking points about the case are the onset after pneumonia; the marked tendency to periodic fever; and the continuous improvement under treatment, which was cut short by a general infection, characterized, at the time of the necropsy, by necrosis of the bowel, focal necrosis of the liver and the spleen, pericarditis, acute endocarditis, and pleurisy.

HODGKIN'S DISEASE.

T. C. Ely³ gives a general discussion of Hodgkin's disease, and reports the case of a child 4 years of age. Her glands first showed enlargement when she was 2½ years old, directly after an attack of whooping-cough. They subsided somewhat after this, but enlarged again, and subsequently decreased in size. There were repeated periods of fever of remittent type. In the period of hyperpyrexia the child exhibited a strikingly ravenous appetite. At the time of death the glands showed enormous enlargement. The blood-examination gave 18 % hemo-

¹ Phila. Med. Jour., Jan. 3, 1903.

² Lancet, March 21, 1903.

³ Phila. Med. Jour., Oct. 18, 1902.

globin, 6066 whites, and 3,624,000 reds. The differential count showed only 1 % of large lymphocytes, with 86 % polymorphonuclears. The author inclines to the view that so-called Hodgkin's disease is chronic lymphatic tuberculosis. [This question is by no means settled, but the most satisfactory view is that a large proportion of cases that have many of the clinical signs of Hodgkin's disease are chronic lymphatic tuberculosis; but there is another condition that is real Hodgkin's disease, that is distinct pathologically, and that probably can be distinguished in most instances clinically.]

W. Broadbent¹ reports a case of Hodgkin's disease in which there occurred **milky effusions in the pleural cavity**, after fairly large doses of arsenic had been administered. He attributes the condition to poisoning with this drug, and refers to other cases that he thinks may have been due to arsenical poisoning. [This conclusion is, of course, unjustified, even in his own case; as such effusions are not uncommonly the result of various forms of extensive enlargements of the lymphatic glands.]

DISEASES OF THE CARDIOVASCULAR SYSTEM.

J. Mackenzie² describes an instrument that he terms the **polygraph**. This will register sphygmograms and respiratory tracings coincidently. The author also discusses the causes of the irregular heart in influenza, giving a number of tracings. He believes that his tracings and clinical studies indicate that when there is discord between the chambers of the heart, the auricles invariably act together, the reason for this being the fact that they develop from a common chamber. He also thinks that his studies show that irregular action of the heart is due, not to vagus stimulation, but to a poison that acts directly upon the heart, as does digitalis.

Blood-pressure.—W. B. Stanton³ reports a practical clinical **method for determining the blood-pressure in man**, and, at the same time, gives a discussion of the methods that have been employed for this purpose. The instrument used by the author is a simple modification of the Riva-Rocci instrument. The rubber armlet is wider than that in the original instrument, being 3½ inches in width; it is also more rapidly and more satisfactorily applied. With it is connected a rubber tube, which, by means of a T-shaped piece, is connected with a manometer and with a bulb pump. The instrument permits of rapid reading of both the systolic and the diastolic pressure. [We are well acquainted with this instrument and consider it the most practical and satisfactory obtainable.]

Buttermann,⁴ in a study of the blood-pressure in various conditions, finds that it is **increased in most cases of acute nephritis**, rapidly falling with improvement in the disease. In amyloid kidney there is no change in pressure or in the condition of the heart. In chronic parenchy-

¹ Brit. Med. Jour., May 16, 1903. ² Brit. Med. Jour., Nov 1, 1902.

³ Univ. of Pa. Med. Bull., Feb., 1903.

⁴ Deut Arch. f. klin. Med., Bd. lxxiv, Hefte 1 u. 2.

matous nephritis the conditions vary. It is probable that the conditions of blood-pressure are largely dependent upon the condition of the heart and upon the degree of anemia, and the author thinks that the edema of chronic parenchymatous nephritis has a **direct relation to insufficiency of the heart**. He took the blood-pressure in normal persons after venesection, finding that the pressure decreased in direct proportion to the amount of blood removed. This **demonstrates the therapeutic value of venesection** in certain conditions, and he believes that in many pathologic states the duration of the reduction in blood-pressure would be longer than in normal persons. He found that the constriction of one arm, preparatory to venesection, caused a rise in the blood-pressure of the other arm of from 8 to 10 mm.—a fact of some importance. In the very early stages of chronic lead-intoxication he found no change in the pressure in 3 instances. In cardiac cases, after exercise, he found that those with fairly good compensation exhibited an increase in pressure, just as normal persons do. Those with marked cardiac symptoms and others with cardiac weakness from chlorosis, and the like, all showed, with increased dyspnea, a fall in blood-pressure. Such an occurrence the author considers to be of importance in prognosis, and also in **determining the immediate condition of the heart**.

J. Grossman¹ has made a study of the **influence of hyperisotonic and of hypotonic mineral-water** upon the blood-pressure. No effects of any consequence could be discovered within 5 hours after drinking large amounts of these waters. The osmotic tension of the urine increased after the use of the more concentrated and decreased after that of the less concentrated. This was the direct effect of the salt-content of the waters. The author insists with Strauss, therefore, that the organism has the power of regulating the blood-pressure, in varying circumstances, with the utmost rapidity.

H. von Hoesslin² finds the osmotic pressure of the blood to be **reduced at first by abstraction of blood**, but it soon increases, even above the original point. If the animal is killed by hemorrhage, this continues until death. If only a moderate amount of blood is withdrawn, the original values are regained within a day when sufficient water is given. The albumin-content of the blood-serum, as well as the hemoglobin, decreases continuously, in direct proportion to the amount and the prolongation of the bleeding. The conditions observed are probably due to the flow of a fluid rich in salts and poor in albumin from the tissues into the vessels.

Federn³ considers that the **splanchnic nerve is of chief importance** in determining the blood-pressure. Variations in its activity cause extreme variations in the blood-pressure. He states that in women one can determine regular curves, from the time of puberty to that of the climacteric, running from one menstrual period to another. He considers von Basch's sphygmomanometer the most satisfactory instrument,

¹ Deut. med. Woch., April 16, 1903.

² Deut. Arch. f. klin. Med., Bd. lxxiv, Hefte 5 u. 6.

³ Wien. klin. Woch., 1902, No. 33.

as one may with this determine the pressure in various arteries. He finds that the blood-pressure in various regions of the body differs greatly, and that the pressure on the two sides may differ as much as 30 mm. to 40 mm.

Zavaldi¹ presents several clinical observations, from which he believes that **heroin reduces the blood-pressure**, particularly in those cases in which the pressure is abnormally high.

DISEASES OF THE HEART.

L. Ferrannini² states that by **injecting emulsions of the hearts** of frogs and toads into guineapigs and rabbits, respectively, he has been able to produce serums that have decided toxic effects upon the hearts of frogs and toads. The rabbits did not stand the injections well, and many of them died. The guineapigs bore the injections much better. The hearts of the frogs and toads were studied directly after the injection, and it was found that the effect had been to produce stimulation of the heart in small doses, and paralysis of the heart in large doses. The effect of the guineapig serum upon the frog-heart was much more pronounced than that of the rabbit-serum upon the heart of the toad. [The work is too briefly reported to be convincing. Much of the work on cytotoxins arouses some skepticism because the results are so brilliantly and exclusively positive.]

C. Bouchard and Balthazard,³ after studying certain **special coefficients in the measurements of the heart** in normal and in tuberculous subjects, reach the conclusion that tuberculous persons may be divided into two classes: first, those that are not predisposed to the disease, but contract it by contagion; and second, the predisposed. The first have normal cardiac measurements; in the second, the heart-measurements are small. The authors think that the determination of the presence of a small heart indicates some predisposition to tuberculosis.

H. Singer⁴ insists upon the importance of observing the **effect of training upon the recovery of the power** of the heart. The patient may be instructed to make the observations himself, by counting his pulse after certain definite exercises, carried out at comparatively frequent times. The author states that by studying the effect of exercise upon the heart one may, more successfully than in any other way, determine whether there is improvement in the condition of the heart, establish a prognosis, institute rational therapy, and **obtain the earliest warning** that too much is being demanded of the heart, and that the patient is in some danger.

Jacobäus⁵ recommends daily **weighing as an important diagnostic measure**, particularly in cardiac disease. The especial usefulness of this measure he finds in determining whether an increase in weight is due to an actual putting on of tissue or merely to collections of fluid. In case

¹ Gaz. degli Osped., No. 51, 1902. ² Zent. f. innere Med., April 11, 1903.

³ Rev. de la Tuberc., April, 1903.

⁴ Zeit. f. klin. Med., Bd. xlvi, Hefte 3 u. 4.

⁵ Zeit. f. diät. u. physikal. Therap., Bd. vi, Heft 7.

marked variations in the weight occur from day to day, one is justified in considering that this is due to a hydropic condition. One can, in this way, at times determine positively that the tissues are becoming edematous, even before ordinary methods of physical examination can show this.

J. W. Runeberg,¹ in a general discussion of **syphilitic disease of the heart**, states that he believes syphilitic disease will come to be considered quite as frequent and important in relation to the heart and to the great vessels as it has grown to be in connection with the central nervous system. He refers to the literature, and then states that the most common syphilitic disease of the heart is sclerogummatus arteritis of the coronaries, which produces attacks of true angina pectoris with other symptoms of fibroid change of the heart. He believes that syphilis should be considered to be the cause of such symptoms when other causes are reasonably excluded and the patient is less than 50 years of age. He considers that aneurysm of the aorta is most commonly due to syphilis. Gummas of the heart are comparatively rare, but a diffuse gummatous myocarditis associated with arteritis of the coronaries is not uncommon. The author admits that his description is based chiefly upon clinical experience, and does not give any pathologic evidence in support of his view.

E. von Leyden² discusses **hemisystole**, referring first in detail to the case that he reported in 1868, which he still believes to have been an example of hemisystole. The most characteristic points about the case are that there were two impulses, one following directly after the other; that these were followed by a much longer interval; and that this cycle was then repeated. The first impulse was the stronger, and was felt more toward the left; the second was felt over the region of the right ventricle. Auscultation showed 3 murmurs. The first was long; the second, short; the third also long, and rough. At the base of the sternum the second murmur became much louder than elsewhere, and with the second murmur one could hear the strong impulse of the right ventricle. A strong carotid pulse could be felt, and afterward two pulsations in the vein. The liver pulsated. The author believes that this was undoubtedly a case of systole of the two ventricles occurring at a different time, because the first impulse seemed certainly to be that of the left, and the second that of the right ventricle—chiefly because of the points at which these two systoles were strongest and because of the peculiar pulsations in the vessels of the neck. The carotid pulse preceded that in the veins. Leyden has since observed this condition clearly in 2 cases, and less distinctly in others. He mentions some of the more recent **physiologic work demonstrating the possibility of hemisystole**, and decides that he was right in considering these cases to be hemisystole.

D. Drummond,³ in discussing the diagnosis of heart-disease, refers to the **frequency of functional murmurs** in nervous persons and in cases of chronic palpitation. These murmurs are usually systolic, but may be

¹ Deut. med. Woch., Jan. 1 and 8, 1903.

² Deut. med. Woch., May 21, 1903.

³ Brit. Med. Jour., Nov. 1, 1902.

postsystolic, or even diastolic. They are loudest when the patient is standing, and disappear when he is at rest or assumes the recumbent posture. The author considers alcohol to be a common cause of permanent mitral regurgitation, and believes the **heart of the alcoholic to be most insecure** and likely to cause sudden death. In chronic alcoholism he has often noted a permanent systolic murmur, sometimes accompanied with a tricuspid murmur. He has frequently seen marked attacks of tachycardia in alcoholics, strychnin being apparently the best drug to control the symptoms. He considers the prognosis in alcoholic hearts to be always very grave. Sudden death is common. He believes that one may now speak of syphilitic heart as freely as of rheumatic heart. Syphilis affects the aortic orifice much more frequently than the mitral. If, in a middle-aged person, a history of rheumatism is absent, **syphilis should be thought of** as the next most common cause of heart-disease. One of the most important signs of syphilitic disease of the heart and aorta is pulsation in the episternal notch. In syphilitic hearts is it common for compensation to fail without any evident cause. Dilation of the aorta is an almost constant accompaniment of syphilitic disease of the heart, and is important in the diagnosis. As to the heart of kidney-disease, Drummond emphasizes the importance of reduplication of the first sound as an **indication of the renal origin** of the condition [it is, however, often due to other causes], and also as an indication that compensation has begun to fail. Cardiac dilation in nonalcoholic patients, in the absence of primary valvular disease, is usually of renal origin. As to dilation, the author insists upon the importance of a striking disparity between the force of the cardiac and of the radial impulse; and also upon the importance of increase in the size of the liver and of a small excretion of urine, in demonstrating the presence of the condition when the local signs are uncertain. He insists that it is of importance to examine the patient when he is lying on his left side, in order to demonstrate the presence of a systolic murmur at the apex. The sharp systolic rap on palpation noted in mitral stenosis may be distinguished from that due to nervousness or to overexertion by observing that it is felt best toward the right side of the precordia, rather than toward the left, and that it occurs at the end of systole. In excitement it occurs at the beginning of systole.

R. C. Cabot and E. A. Locke¹ discuss the **diastolic heart-murmurs** that occur **without lesions of the aortic or of the pulmonary valve**. After extensive references to literature, they report 4 cases of their own, one of which they place in the class that is commonly attributed to genuine regurgitation resulting from dilation of the aortic ring, the other 3 cases belonging to the class in which there is associated intense anemia. For 2 of the cases, in which the blood-pressure was low, the authors could find no more satisfactory explanation than that given by Sahli—viz., extreme thickening of the blood. Such diastolic murmurs without organic valvular lesions are, they find, not uncommon complications of dilation of the aorta, localized or diffuse, and they may also occur when

¹ Johns Hopkins Hosp. Bull., May, 1903.

there are adhesions between the pleura and the pericardium. The last-mentioned murmurs are decidedly affected by respiration and by position. They are probably due in all cases to **suction or pulsion exerted by the heart** upon portions of the lung that are adherent to the pericardium. These diastolic murmurs also occur in connection with severe anemia, under circumstances when they may not be satisfactorily explained by a permanent dilation of the aortic ring, by cardiorespiratory conditions, or by a diastolic accentuation of a venous hum. These last-mentioned murmurs are of very obscure origin.

Pericarditis.—A. O. J. Kelly¹ discusses multiple serositis,—the association of **chronic obliterative pericarditis with ascites**,—with particular reference to the “pericarditic pseudocirrhosis of the liver” of Pick, and to the “iced liver” (Zuckergussleber) of Curschmann. The case reported was that of a man, 31 years of age, who had had rheumatism. He was said to have been jaundiced, and he had had a good deal of pain in the abdomen. He had also been subject to convulsive seizures and had had mental disturbance. He had had marked ascites, tenderness in the region of the liver, and slight swelling of the feet. The case had been diagnosed cirrhosis of the liver, and the patient had been operated upon for this condition. He died 4 days later, and the postmortem examination showed obliteration of both pleural cavities, firm adhesions of the pericardium with obliteration of the pericardial cavity, and extensive calcareous infiltration of the pericardium, chronic perihepatitis, and slight congestion of the liver. The consistence of the liver was somewhat increased, and there was some increase in connective tissue. The author reviews the literature of this condition and collects the cases that have been reported, tabulating 39 cases, of which 21 occurred in males and 18 in females. He notes that although all the cases presented ascites as the striking clinical feature and showed obliterative pericarditis at the autopsy, the **liver presented a variety of lesions** in the different cases; and also that in all the cases more than one serous membrane was diseased—in some of the cases, all the serous membranes. The feature possessed in common by the cases was, therefore widespread disease of the serous membranes, the most common lesion being chronic hyperplastic serositis. The disease may begin with primary disease of the pleura, but in some cases the pericardial disease has certainly been primary, and it is difficult to eliminate it as the primary feature of the condition. **Many of the cases are probably tuberculous**, but some are not. In Kelly's case there was no evidence, on gross or on microscopic examination, of tuberculosis. Chronic nephritis may be the etiologic factor in some cases; in other cases it may develop from cholelithiasis with localized peritonitis. The author explains the **intensity of the lesions about the liver** through the fact that there is in the peritoneal cavity a force that carries fluids and foreign particles toward the central tendon of the diaphragm. This may result in the passage of these substances (infectious agents) into the mediastinum and in the involvement of the pericardium or the pleura; or in their arrest

¹ Am. Jour. Med. Sci., Jan., 1903.

in the region of the liver, and in the consequent production of a perihepatitis. In the majority of cases, in the author's opinion, the ascites may be satisfactorily explained by the perihepatitis and the peritonitis; and he thinks it **unnecessary to consider that the liver is concerned** in its production. He also says that the condition of the liver is not that usually associated with the production of ascites. In a few cases ascites may be the direct result of congestion of the liver, as it is in some unusual cases of valvular disease of the heart in which disproportionate ascites occurs. In the **diagnosis of multiple serositis** or of chronic adhesive pericarditis with ascites, one should especially search for a previous history of acute pericarditis, pleurisy, or perihepatitis, and for the early occurrence and the subsequent disappearance of edema of the legs. The important signs of the condition are marked ascites with little or no edema of the legs; enlargement of the liver in the early stages, and small and distorted, but smooth, liver in the later stages; the absence or late occurrence of marked enlargement of the spleen; a tendency to repeated attacks of perihepatitis; the rapid recurrence of ascites after tapping; and the various physical signs of adherent pericardium, the latter being the only characteristic evidences of this special disease. The condition needs to be distinguished chiefly from cirrhosis of the liver. This is done particularly by discovering signs of adherent pericardium; by eliminating the etiologic factors of cirrhosis; by demonstrating a slow, insidious, protracted course of the disease; by the absence or the transient presence of jaundice; by the absence of signs of portal congestion; in some cases, by the observation of a smooth, firm enlargement of the liver with marked ascites; and by the fact that in many cases the patient survives a large number of tappings.

J. B. Herrick¹ reports a case of so-called pericarditic pseudocirrhosis of the liver in a young man 19 years old. The patient had pleural effusion on both sides, an impalpable apex-beat, and a weak first sound, but no murmur. He had marked prominence of the veins of the neck, and cyanosis upon assuming a recumbent posture. Necropsy confirmed the diagnosis that had been made clinically. Another case is mentioned, which was considered to be almost certainly one of the same kind. The author insists that Pick's statement that pericarditis is latent in these cases is not by any means always true. He also insists upon the importance of **associated endocarditis and myocarditis** in the production of the symptoms. [While this condition has been known so long that there is no justification for calling it "Pick's disease," it is undoubtedly due to Pick's energetic writings that the condition is frequently correctly diagnosed at present, since he directed attention to it much more generally than had before been the case.]

G. A. Gibson, H. H. Bullman, and A. F. R. Conder² report an interesting case of **adhesive mediastinopericarditis** in a boy of 16. There were signs of marked cardiac incompetence, with decided cyanosis, general anasarca, and much ascites. Paradoxic pulse could not be determined to be present by palpation, but sphygmographic tracings, with

¹ Chicago Medical Recorder, Sept., 1902.

² Practitioner, Feb., 1903

tracings of the respiratory movement, showed that there was an ill-developed paradoxical pulse. The liver was greatly enlarged, and the spleen was relatively (for this condition) decidedly enlarged. No signs of vascular lesion could be found, and there were evidences of marked interference with the venous return to the heart. There was no apparent cause of myocardial weakness; it was therefore decided that the case was probably pericardial in origin, and very likely tuberculous.

J. H. Plesants¹ discusses **traumatic pericarditis**, endocarditis, and myocarditis, referring, of course, to the condition that follows injury to the chest, and not to direct injury to the pericardium or to the heart itself. He describes 2 cases of traumatic pericarditis, and refers to the possibility that the pericardium may be injured by contre-coup. He believes that this cause of pericarditis is by no means sufficiently recognized. He could find on record only 4 cases satisfactorily reported. Trauma may cause acute or slowly progressing chronic **endocarditis** to develop in a heart previously sound. The author describes a case that he believes to belong to this class, and separates the cases into 3 groups: those in which the symptoms of acute endocarditis develop within a very short time after the trauma; those in which there is a varying interval after the trauma, followed by chronic endocarditis; and those in which injury to various parts of the body merely gives entrance to microorganisms, and these microorganisms accidentally produce disease of the heart. This condition also, he thinks, may be due to contre-coup. He gives a summary of the cases of acute and of chronic endocarditis due to trauma, the total numbering 14. **Traumatic myocarditis**, he thinks, must be recognized as a distinct possibility. One of the cases of pericarditis he believes to have developed myocardial changes as the result of trauma. He describes 4 cases in which he thinks that trauma was the definite cause of myocarditis.

J. O. Symes² describes the case of a boy of 19 with **tuberculous pericarditis**, in which it had become necessary to carry out 4 aspirations of the pericardium. The patient died. It is worthy of note that by centrifugating the fluid in an electric centrifuge tubercle bacilli could easily be demonstrated.

F. Riegel³ discusses **paradoxical pulse**, referring briefly to the literary history of this phenomenon, and then stating his conclusion that paradoxical pulse must be **divided into three kinds**. In the first, it is due to mediastinopericarditis, and is the direct result of the simple mechanical compression of the large vessels; in the other two, it is due to changes in the power of the heart-action. In the second, this change is due to disorders of inspiration, such as those produced by laryngeal stenosis; the negative inspiratory pressure is increased thereby, and this influences the power of the heart-action. In the third class the heart-action is directly weakened by disease. This class includes a very large variety of cases, from simple temporary cardiac weakness during convalescence from acute diseases to grave organic heart-disease. It is always important, par-

¹ Johns Hopkins Hosp. Bull., May, 1903.

² Lancet, May 6, 1903.

³ Deut. med. Woch., May 14, 1903.

ticularly in relation to therapy, to determine to which of these causes paradoxic pulse is due. This is, however, often a difficult matter. [There has been much too general a tendency to consider paradoxic pulse a sign of pericardial or mediastinopericardial disease exclusively. Riegel's discussion of the condition is valuable and well-timed.]

Acute Endocarditis.—J. B. Herrick,¹ discussing the **healing of ulcerative endocarditis**, draws attention to the fact that while this condition is usually malignant and fatal, it is not at all impossible for it to end in healing. The literature of the subject is referred to, and the author then reports the case of a child of 3 years with pneumococcic septicemia and the development of endocarditis. There was a septic temperature, with 2 crops of petechias, splenic enlargement and then a prolonged gradual convalescence. The child ultimately recovered its health, with the exception of chronic valvular defect. The author also describes 3 cases in which the pathologic specimens furnished by Hektoen indicated that apparently there had been recovery from severe infectious endocarditis.

N. M. Harris and W. B. Johnston² report a case of **gonorrhreal endocarditis** in which they **cultivated the specific organism from the blood during life**. The case ended fatally, and the gonococcus was obtained by culture. It did not grow when transferred to hydrocele agar, but did develop slightly on plain agar. It grew luxuriantly on human blood and agar. The necropsy showed huge vegetations on the mitral valve, and there were infarcts in various organs. The authors discuss the observations made by others and by themselves as to blood-cultures, and insist upon the fact that positive cultures were almost always **obtained when the blood was not diluted** or was diluted but little. Even slight dilution with bouillon seemed to prevent the growth of the gonococcus. In the fatal case reported, positive results were obtained as early as the ninth day, and perhaps as early as the eleventh day, before death. In the authors' cases the agar-plate representing the least dilution and the largest amount of blood gave the greatest number of colonies. They think that solid media are preferable, and that the blood had best be mixed with melted agar and plated, thus giving a free supply of oxygen. The bactericidal action of the blood upon the gonococcus seemed to be but slight.

C. J. Habhegger³ reports a case of malignant endocarditis that he considers to have been of gonorrhreal origin, his reasons for this belief being that the endocarditis **followed an attack of gonorrhea**; that cocci morphologically like gonococci were found in the vegetations; and that cultures from the blood during life and from various sources after death, including the vegetations, were sterile.

G. Fazio⁴ describes a case of **malignant endocarditis with an apyretic course**. The cause of the condition could not be discovered. The man had the evidences of severe endocarditis, but without fever at any time. The postmortem examination showed partial destruction of

¹ Med. News, Sept. 6, 1902.

³ Phila. Med. Jour., May 30, 1903.

² Johns Hopkins Hosp. Bull., Oct., 1902.

⁴ Gaz. degli Osped., March 8, 1903.

the aortic valves and perforation of the right cusp of the mitral valve. Bronchitis was the only source of infection that seemed reasonable.

H. M. Fisher¹ reports a case of ulcerative endocarditis **with large vegetations on the pulmonary valves**, almost entirely filling the lumen of the pulmonary artery, and extending into the artery and also into the right ventricle for some distance. The condition was apparently subacute. The onset of the severe symptoms of cardiac incompetency had followed erysipelas, though the patient was rheumatic. He exhibited no fever during the course of his disease, and his pulse was rather slow and regular.

Sir Dyce Duckworth² reports the case of a boy of 15 years with the evidences of severe infective endocarditis that did not respond to treatment. He administered subcutaneously 10 cc. of **antistreptococcic serum**, made from mixed cultures, but no improvement occurred. The serum was employed in doses of 10 cc. daily, by means of **rectal injections**. Improvement commenced 2 days after this method of treatment had been instituted, and progressed continuously. [It is impossible to understand how rectal injections of a specific serum could be even as effectual as subcutaneous injections!]

M. Manges³ reports 2 cases of ulcerative endocarditis in which he used **intravenous injections of collargol** without any satisfactory result. [We have used this treatment with somewhat promising results.]

R. Caton⁴ contributes some clinical remarks upon the causes that **prevent the restoration of normal valve-function** in rheumatic endocarditis. He insists upon his previously emphasized view that the essential treatment for these cases is absolute rest and freedom from excitement, and the encouragement of sleep; together with this, gentle blistering of skin-areas that have nerve-connection with the heart, and the use of moderate doses of sodium iodid. He contributes some observations upon 4 cases.

Chronic Valvular Disease.—L. Jacobi⁵ reports a case of aortic regurgitation that was interesting on account of the presence of a **musical murmur** that was so loud as to be at one time audible across a fairly large room. [We have seen several striking cases of musical murmur in the past year; and all but one were aortic regurgitant murmurs—an experience that is the usual one.]

W. Broadbent⁶ presents some sphygmograms and cardiograms to demonstrate the truth of W. H. Broadbent's contention that the pulse in aortic regurgitation is **the more delayed, the greater the regurgitation**.

Hofbauer⁷ reports a case of **paralysis of the recurrent nerve in mitral stenosis**. The patient, a man of 32, had, with the signs of mitral stenosis, a hoarseness that was determined to be due to paralysis of the left recurrent. Examination showed the absence of aneurysm, mediastinal tumor, or pericarditis, and of any other discoverable cause of

¹ Phila. Med. Jour., May 30, 1903.

² Brit. Med. Jour., May 23, 1903.

³ Med. News, Dec. 13, 1902.

⁴ Lancet, Aug. 23, 1902.

⁵ N. Y. Med. Jour., Aug. 9, 1902.

⁶ Lancet, May 23, 1903.

⁷ Wien. klin. Woch., No. 41, 1902.

paralysis of the recurrens, except the mitral stenosis. The author thinks that the paralysis was due to compression of the nerve by the enlarged left auricle. The influence of change in position upon the hoarseness seemed to increase the probability that this view was correct. The hoarseness increased when the patient turned to the left or bent forward, and was less when he lay on his back or right side. [This symptom in mitral stenosis has been reported a number of times in recent years; and its recurrence when aneurysm seems reasonably improbable should certainly suggest that it might be due to mitral stenosis.]

G. A. Wilkes¹ reports 2 cases of **mitral stenosis in which pregnancy occurred** and death followed soon after parturition. He emphasizes the danger of grave loss of compensation in mitral stenosis, if pregnancy occurs.

T. E. Satterthwaite² considers that a **temporary pulmonary insufficiency** is of common occurrence. He reports studies of 4 cases. He describes these briefly, and states that the necropsy showed insufficiency of the pulmonary valves, with various other lesions, in each of these cases. He also describes a case of pulmonary stenosis in which there was no other lesion—an unusual condition of affairs; and also mentions a case in which he thinks pulmonary stenosis was produced temporarily by the pressure of an abscess, and was relieved by incision. [There is no definite proof other than clinical opinion that temporary pulmonary regurgitation occurs. It seems wholly possible that it may, however; but if it does, it is probably not important in itself but only as evidence of a necessary attempt at compensation.]

De la Camp³ reports a series of 6 cases, all in **members of the same family**, in which he found the evidences of **congenital cardiac disease**, the signs pointing to patulous ductus arteriosus. He discusses briefly the occurrence of familial congenital cardiac disease. It was of interest to note that the parents and the grandparents were not blood relations, and they showed no anomalies such as congenital cardiac disease or hemophilia. The mother had no evidence of syphilis, but the father was an alcoholic. Syphilis in the parents is probably an important factor in the production of congenital cardiac disease. The author mentions 2 sisters who had congenital cardiac disease, both of whose parents showed imperfectly treated tertiary syphilis.

J. Burke⁴ reports 3 cases of **congenital pulmonary stenosis**, in all of which there was a striking accentuation of the second pulmonary sound. The ductus Botalli was, for this reason, considered to be persistently patulous; but in none of the cases was a trace of this found. On the other hand, the **foramen ovale was open** in all the cases. From these cases and from a study of literature, the author concludes that there is no justification for the statement that accentuation of the second pulmonary sound indicates an open ductus Botalli. He believes, however, that a patulous foramen ovale is a sufficient explanation for this accentuation of the pulmonary second sound; and he even

¹ Brit. Med. Jour., Jan. 17, 1903.

² Med. News, Sept. 6, 1902.

³ Berl. klin. Woch., Jan. 19, 1903.

⁴ Buffalo Med. Jour., Aug., 1902.

thinks that this accentuation is diagnostic of a patent foramen ovale. He finds that there is also a **narrowness of the aorta** associated with the pulmonary stenosis, and he believes that this factor is an important cause of the frequent occurrence of complicating pulmonary tuberculosis.

Myocarditis.—Giacomelli¹ has made an experimental study of **segmentary myocarditis**. He considers that fragmentation and segmentation of the heart-muscle are observed most frequently in auto-intoxications or in poisonings with various substances; such as chloroform, mercury, etc. It is more common in such conditions than in actual infections. Mechanical factors, such as a brusque, violent contraction of the heart induced by electricity, do not produce this condition. The importance of the condition is, in the author's opinion, great. There is no direct relation between ordinary forms of degeneration and the condition under discussion. Segmentation may develop with the greatest rapidity. Giacomelli has observed it in strangulated hernia that had run a course of only 24 hours. He has been unable to produce the condition in animals; and believes that this was due to the different reaction of the heart-muscle of animals from that of man. [The more general view of pathologists at present is, we believe, that segmentation of the heart-muscle is probably an agonal change or an artefact and not a peculiar disease-process.]

Rupture of the Heart.—A. S. Hamilton² discusses **spontaneous rupture of the heart**, and reports 7 cases. He finds no instance of spontaneous rupture of a healthy heart in which proper microscopic studies have been made. The condition is, however, said to have occurred in animals hunted to death. Many writers state that rupture ordinarily occurs as the result of excitement or of exertion. This, the author believes, is not the case. It commonly occurs in elderly persons. The wall of the left ventricle is most frequently ruptured, near the apex, on the anterior surface. The escape of blood may be very rapid, or there may be a gradual oozing. The microscopic lesion most commonly found is fatty degeneration. The symptoms are usually obscure. The patient may die with the utmost suddenness, or life may be prolonged. In the latter case there is commonly intense pain in the precordial region and marked dyspnea. There are also the general signs of collapse. There may be marked vomiting, and even diarrhea. Gradual increase in the area of cardiac dulness, indicating increasing pericardial effusion, is an important sign. The cases reported all occurred among patients in a hospital for the insane. There were 7 cases of this kind among a total of 1693 deaths in the hospital.

Aneurysm of the Heart.—F. Kraus³ reports a case of true **aneurysm of the right aortic sinus** of Valsalva. The patient was a man of 27 years, who after severe muscular effort, was overcome with weakness, and had very marked palpitation and sudden pain. He afterward developed hemoptysis and other signs of cardiac incompetency, with a quick pulse and a loud arterial tone, and with enlargement of the cardiac dulness,

¹ Rif. med., 1902, Nos. 253 to 255.

² Phila. Med. Jour., Jan. 24, 1903.

³ Berl. klin. Woch., Dec. 15, 1902.

particularly toward the left. There was a loud, rough, prolonged murmur at the third interspace, which began with systole and ran into a short, hissing diastolic murmur, which replaced the second sound. The diagnosis was not made in this case. Postmortem examination showed that the course of the aneurysm had ended, as is common in these cases, by bursting through the interventricular wall, and thus producing an acquired communication between the ventricles. The chief pathologic effect of these aneurysms is produced by reducing the lumen of the cavities of the right heart through pressure. After rupture, the condition produces the signs of uncomplicated communication between the ventricles. There are, therefore, **2 forms of communication between the ventricles**; one congenital, and the other acquired. In the first a long life is possible, because there has been a gradual accommodation of the heart-muscle to the defect. In the second a grave defect is rapidly produced, and it may cause an immediate fatal collapse, and is likely to produce such serious cardiac incompetency that life lasts but a short time. The diagnosis of aneurysm of the sinus, while considered possible by some authors, is thought by Kraus to be a very doubtful possibility.

Foreign Body.—B. Fischer¹ describes the case of a boy of 13 who was admitted for suppuration about the hip-joint, which proved to be entirely periarticular, to extend well upward, and to be associated with caries of the spine. The patient ultimately died of sepsis. It was observed that he had a **striking rapidity of the pulse** throughout the whole period of observation, even when the temperature was for a considerable time low. The pulse was also irregular and was not influenced by digitalis. The cardiac condition was otherwise negative. The post-mortem examination showed adhesion of the pericardium, and in the wall of the right ventricle there was a **piece of a large needle**. The piece of needle was 3 cm. in length. It did not project into the heart-cavities. One end of it, however, lay directly beneath the thickened endocardium. The rapidity and irregularity of the pulse were probably due to the presence of this foreign body in the heart-wall. **Such symptoms are somewhat characteristic** of this condition. No point of entrance could be found, but it was thought that the needle had probably been swallowed and had perforated through the esophagus.

Displacement of the Heart.—L. Braun² discusses the term "**wandering heart**," much used nowadays by a number of German and Italian clinicians. He distinguishes between wandering heart and cardi-optosis. The latter is considered to be due simply to the enlargement of the organ that is always present when the heart sinks to a lower level than the normal. Wandering heart has been thought by a number of observers to be the cause of numerous symptoms; but Braun considers that these symptoms are really due to either coincident disease of the heart or the general neurasthenia that is usually present in such patients. He insists that persons that are perfectly normal exhibit varying degrees of movability of the heart, and that small differences cannot be considered

¹ Deut. med. Woch., Aug. 21, 1902.

² Zent. f. innere Med., Aug. 30, 1902.

to be sufficient to explain decided symptoms. He believes that **the term should disappear** from clinical pathology and terminology.

M. Einhorn¹ discusses cardiotopsis and its **relation to floating liver**, reporting several cases and giving a table of 15 personal cases. He finds the condition much more common in men than in women, in contrast with enteroptosis. The chief symptoms are nervous disturbance of the heart, vertigo, and inability to lie on the left side. The heart-dulness is found lower than normally, and mobility is usually increased. In about half the cases there is general enteroptosis. The prognosis is good, general treatment being indicated.

Disturbances of Rhythm.—E. Rehfisch² discusses the **prognosis of cardiac arrhythmia** from the standpoint of the more recent teaching concerning its origin. After mentioning the newer physical points related to this anomaly, he discusses **extra systole**, which is characterized by the occurrence of a systole at an unduly early period following the preceding systole, and by the fact that the next systole—*i. e.*, the third in the series—occurs at a point that is almost exactly two complete heart-cycles distant from the first systole. This is clearly shown only by sphygmograms. This form of arrhythmia may have a very satisfactory prognosis, and often does; though it may also occur in persons with grave cardiac or vascular disease. Its importance in the individual case can be determined only by recognizing the character of the lesion with which it is associated. Extra systole is due to some abnormal irritation, which produces the occasional unduly rapid systole. The next form of arrhythmia discussed by the author is due to a disturbance in the progress of the wave of contraction of the heart. When this form is characteristic, it may be readily distinguished from nervous arrhythmia or extra systole by the fact that the interval between the two pulses, when intermission occurs, is always less than two full pulse-periods. The reason for this is that the **cardiac contraction is blocked** at the “block-fibers,” with the result that the systole of the ventricles follows the systole of the auricles at an increasingly longer period; until finally an auricular systole occurs, but there is practically no room for a ventricular systole. That one is, therefore, omitted; but the time occupied between the preceding and the next following systole is less than two complete heart-cycles. This variety of arrhythmia is much more important than the former, because more grave. There are also forms of arrhythmia in which the **intermissions are extremely irregular** or occur almost constantly. These are seen in the Adams-Stokes syndrome, for instance. The second form of cardiac arrhythmia is often met with in infectious diseases with more or less grave disturbance of the heart. The prognosis is much worse than in extra systole. It depends largely upon the other signs of grave lesions of the heart. The author also mentions **pulsus myrus**, which is characterized by the fact that the contractions follow each other at constantly shorter intervals until a minimum is reached. He likewise refers to **pulsus alternans**, in which a high pulse-wave is followed by a low one; and in which one hears, upon auscultation, a loud tone followed

¹ Med. Rec., April 25, 1903.

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² Deut. med. Woch., May 14 and 21, 1903.

by a softer; the distance from the larger pulse to the smaller being always slighter than that from the smaller to the larger. This pulse always indicates a hypodynamic state of the heart. The prognosis in this condition is decidedly serious.

A. Merklen¹ discusses the somewhat mixed group of cases in which **paroxysmal tachycardia** is the leading symptom. In some of these cases there is no other sign than the tachycardia. Often, however, there is palpitation or some other evident disturbance of circulation. If tachycardia is the sole sign present, it may be discovered purely by accident. The author **divides the cases into 2 groups**, in the first of which the attack is short, perhaps accompanied only by a slight sensation of vertigo, a little epigastric and pericardial distress, and some pain radiating toward the left arm. The pulse may run as high as 250 per minute, and may be regular or irregular. There is usually pallor, often polyuria, and sometimes glycosuria. There is little alteration of respiration. The other functions may be entirely undisturbed, except that there may be slight elevations of temperature and the patients are likely to be somnolent. In some cases, however, the greatest comfort is obtained by taking long walks. The termination of these attacks is usually extremely abrupt, as is the onset. In the second group the attacks are of prolonged duration; and, besides the symptoms already mentioned as occurring in the other group, there are likely to be evidences of cardiac failure from dilatation, the symptoms of this usually appearing after 5 or 6 days. These cases not infrequently end fatally, sometimes with great suddenness and sometimes gradually growing worse. The cause of paroxysmal tachycardia is varied, but usually obscure. Hereditary and neurotic constitution are frequently noted, and asthma has repeatedly been insisted upon as a cause. The author considers that it may be produced in predisposed persons by many causes, such as nervous shock or exhaustion, or reflex irritation from disease of various organs. It may be produced by intoxications set up by alcohol, tobacco, tea, and other drugs; or by infectious diseases. If organic disease is present in these cases, the prognosis should be very guarded.

L. Braun and A. Fuchs² describe an alteration in the pulse that they consider to be a **phenomenon of neurasthenia**. They first discuss the normal cardiac rhythm and the effects of irritants upon it, and refer to the fact that variations in the pulse are far greater in neurasthenics than in normal persons. They also note that the rapidity and force of the pulse in neurasthenics are readily altered by slight influences. They state that if a neurasthenic person that shows these pulse-changes readily is placed in a horizontal position for a considerable period, his pulse will gradually approach the normal, and finally is likely to become entirely normal. If, then, such a patient is allowed to make a few active movements, the neurasthenic character of the pulse will rapidly appear again. This they consider to be characteristic of neurasthenia.

H. Silbergleit³ reports 2 cases of **cardiac bradycardia**, one of them

¹ Thèse de Paris, 1902.

² Zent. f. innere Med., Dec. 6, 1902.

³ Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

being in a patient with cardiac sclerosis and probably with severe sclerosis of the coronary arteries. In the second case there was marked aortic stenosis. Both patients exhibited a reduction of the pulse-beats to as low as 36. A portion of the literature concerning bradycardia, especially cardiac bradycardia, is reviewed. The author does not believe that weakness of the heart-muscle is always followed by an increase in the rapidity of the heart-action; but he also does not believe that the bradycardia itself can be shown to have any unfavorable effect upon the heart in most cases. Indeed, he believes that in many instances it is probably a **compensatory condition** that may be compared to the action of digitalis. The prolonged diastole causes the heart to fill better and produces a stronger contraction. Cardiac bradycardia is observed in many different forms of heart-disease, chiefly in association with disease of the heart-muscle, lesions of the coronary arteries and of the large vessels (aneurysm), and valvular disease—especially stenosis.

H. Luce¹ contributes an extensive discussion of the clinical characteristics in the pathologic anatomy of the **Adams-Stokes symptom-complex**, reporting one case at length. In this he particularly refers to the discovery at necropsy that while the nucleus of the tenth nerve was normal and the intramedullary fibers of the vagus showed no change, the extramedullary fibers were in large part degenerated. His study of this case and of the literature leads him to the conclusion that organic lesions of the walls of the heart may lead to a severe partial secondary retrograde degeneration of both vagus nerves. He thinks that important branches of the vagi are found in the ventricular walls; and that the peripheral terminations of these nerves are found directly in the heart-muscle, there being no interposed ganglia. The trophic control of the heart is directly under the influence of the vagus nerves. The occurrence of bradycardia in cases with bilateral degeneration of the vagus nerve from central or peripheral cause makes it extremely likely that bradycardia **arises in disorder of the heart-muscle**. This myogenous or urogenous bradycardia is the product of altered function of the heart-muscle; and may be due to nutrition, to general dyscrasias, and to infectious and nervous conditions influencing the heart-muscle. A complete destruction of the upper third of the intraventricular septum, in which most of the nerve-fibers are situated, and its substitution by scar-tissue may have no influence upon the heart-action. The Adams-Stokes syndrome may occur at any period of life and in connection with any disease. The syndrome may run an acute or a chronic course, and it may result in recovery. It is not always associated with arteriosclerosis. The main characteristic is bradycardia. The nervous symptoms vary greatly in different cases. After a study of tumors of the heart, the author decides that these growths have no characteristic clinical symptomatology.

B. Lewy² reports an interesting case of Adams-Stokes syndrome that occurred in a man of 73. The patient, until a short time before the onset of the syndrome, had been in extremely good health. The attacks were

¹ Deut. Arch. f. klin. Med., Bd. lxxiv, Hefte 3 u. 4.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 3 u. 4.

associated with convulsions; with loss of consciousness; and with either an extremely slow pulse, or entire cessation of the pulse, absence of the heart-sounds, and even absence of venous pulse, the latter indicating that the attacks were not completely dependent upon a blocking of the systole at the auriculoventricular juncture. The **cessation of cardiac action** sometimes persisted apparently for as long as 20 seconds. Very brief attacks often occurred successively with the greatest rapidity, attacks lasting for half a minute to a minute having been at one time observed, for instance, as many as 40 times in 90 minutes. The man ultimately died suddenly. A necropsy could not be obtained. One symptom that has not been previously described, but that was very striking in this case, is the occurrence of profuse sweating with each attack.

Angina Pectoris.—Benenati¹ insists that angina pectoris, particularly of syphilitic origin, is **due to neuritis** of the aortic or of the coronary plexus; that the disease is not essentially vascular, but nervous in origin. At times, there is a pure neuritis; at times, there are changes in the minute blood-vessels supplying the nerves. In either case the functional effect is the same. The author describes a number of cases in which he has observed an **obliterating endarteritis of the minute vessels**, or round-cell infiltration or minute gummas along the course of the plexus. He believes that the rapid effect of antiluetic treatment is not explainable on the basis of a primary change in the aorta and in the coronary arteries, but is explainable on the ground suggested by him.

A. Morrison² contributes a series of lectures on the **nature, causes, and treatment of cardiac pain**. He reports an interesting series of sphygmograms taken during the course of and after an attack of angina pectoris; and contributes a series of observations that, he believes, demonstrate his view that constriction of peripheral vessels in this condition is often the result of the attack, rather than the cause. He is also not wholly in sympathy with the view that the attack is due to distention of the heart-cavities, but thinks that it is due to "the distensive throb of the blood cast by a dilated yet powerful ventricle into the aorta and the coronary system." He believes that the role of the bloodvessels has been decidedly exaggerated; that the condition may be due to muscular spasm, to the effects of neuritis, and to hemic conditions, the blood exercising pressure upon local anatomic lesions.

E. H. Colbeck³ discusses the way in which the symptoms of angina pectoris are produced. He criticizes the explanations that have been offered, and states that he believes that the cause of the attack is a **localized distention and stretching of the ventricular wall**. [Much the same view that Musser recently expressed.]

Treatment of Chronic Cardiac Disease.—J. Swientochowski,⁴ after a study of the **influence of alcohol upon the circulation**, makes the positive statement that alcohol cannot be considered to have any but a **harmful influence upon the heart-muscle**. It influences the general circulation weakly, but has no stimulating effect. Its effects upon per-

¹ Rif. med., 1902, Nos. 104-106.

³ Lancet, March 21, 1903.

² Lancet, Nov. 1, 1902.

⁴ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

sons with circulatory disturbances are, the author believes, the same as upon the nervous system. Its apparently stimulating effect upon the nervous system is due purely to a reduction of the perception of weariness or pain, the person really not acquiring a greater power of work from the use of alcohol. The author believes, too, that alcohol should not be freely used in infectious conditions, because it **reduces the resistance to infections**. Some authors have stated that old wines, etc., containing considerable amounts of ethereal oils have an especially good effect. Swientochowski, however, compared very expensive cognac with ordinary schnapps, and saw no difference in their effects.

S. Trzebinski¹ reports 2 cases of chronic anasarea treated by **puncture of the lower extremities**. In one case there was free leakage from the wound, but no noteworthy improvement; and the patient died from cardiac incompetency. In the second case there was very great improvement; but, owing to the carelessness of an attendant in looking after the wound, gangrene developed and the patient died of this. The author has made a study of the literature concerning this question, and reaches the conclusion that cannulas are decidedly superior to mere incisions. The **danger of infection is very slight** if proper care is given to the wound. He believes, after analyzing the literature, that only 12 % of infections can be found, and that under present conditions this is probably much too high a percentage, considering the recent improvements in asepsis. He believes that the operation is indicated in any cases in which anasarea does not yield to cardiac and diuretic drugs. It is regularly used in the Hospital of the Infant Jesus in Warsaw. In that institution the physicians are regularly accustomed to seeing from 2 to 17 liters of fluid pass off in this way in 24 hours. [This procedure is occasionally very useful. It is necessarily, however, largely restricted to hospital practice, for the danger of infection is sufficient to prohibit its use unless excellent nursing and general care can be given the patient.]

DISEASES OF THE ARTERIES.

Arteriosclerosis.—Neusser² discusses the symptomatology of **gastro-intestinal disturbances in arteriosclerosis**. He refers to the occurrence of marked gastrointestinal disturbances in arteriosclerosis as the result of the sclerosis of the coronary arteries alone, and insists that these disturbances are still more common in sclerosis of the abdominal aorta and of its branches. This abdominal variety of angina pectoris is exemplified by the history of a man of 47, who had attacks of violent gastric pain after active exercise. These attacks began with a burning pain deep in the epigastrium, which radiated over the anterior part of the thorax, as high as the manubrium. There was, at the same time, a feeling of constriction of the larynx, sweating, and a flow of saliva. The pain was felt in the back, between the shoulder-blades; and there was, at times, a girdle sense about the chest. [The importance of abdominal symptoms in arteriosclerosis is very great and very insufficiently recog-

¹ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4. ² Wien. klin. Woch., No. 38, 1902.

nized. These symptoms are very common and very likely to lead to erroneous diagnoses.]

O. Kose¹ has used **Trunecek's serum** in 8 cases of arteriosclerosis in Maixner's clinic, without any good effect. He thinks, in the first place, that calcium phosphate is not soluble in this serum; and, in the second, that it would be extremely unfortunate to dissolve the deposits in the arteries, as this would cause great danger of aneurysm and rupture. [It is difficult to see how this so-called "serum" could influence atheroma to any noteworthy degree.]

Rupture of the Aorta.—E. Wasastjerna² contributes an interesting report of rupture of the aorta in a boy 13 years old. It occurred after **overstrain in snowshoeing**. The child was apparently well; and there was no family history of syphilis or of other important disease. After marked over-exercise the boy suddenly became pale, and complained of great pain in the precordial region, palpitation, and vertigo; after a time, however, with some help, he was able to walk part of the way to his home and ascend a flight of steps. He then became delirious; but the next day he was better and walked about a little. The conditions were similar on the following day; but toward evening he suddenly became violently dyspneic and pallid, and soon died. The postmortem examination showed that above the aortic valves there was a sac-like enlargement of the aorta. Two centimeters from the valves was a rupture in the form of the letter Z, the total length of which measured 12 mm. There was a partial rupture a little beyond this. Further examination showed a marked anomaly. Directly beyond the left subclavian the aorta was narrowed to a sac-like form about 3 cm. long; and just beyond this, the **lumen of the aorta was narrowed** to such an extent that it would allow only of the passage of a sound 1 mm. in thickness. The collateral circulation, however, was so markedly developed that the boy had not suffered in his general development at all; but was, on the contrary, unusually well grown for his age. The heart was hypertrophied and somewhat dilated.

Aneurysm.—C. B. Wall and A. Walker³ discuss the cause of **inequality of the pupils** in thoracic aneurysm. They believe that this cannot be satisfactorily attributed, as it usually is, to a lesion of the cervical sympathetic. The pupillary changes do not correspond with those due to sympathetic lesions, and there are no other signs of such a lesion in most cases. The authors refer to the fact that marked **changes in the vascular tension** influence the size of the pupils, high tension being accompanied with contraction, low tension with dilation of the pupils. They believe that the changes in aneurysm are due to changes in the vascular tension on the two sides. One can often find that the temporal and the radial pulse on the side of the dilated pupil are weaker than they are on the other side. One can also produce dilation of the pupil by compressing one carotid, and they state that in a dead rabbit it is possible to cause contraction of the pupil by injecting water into one carotid.

¹Zent. f. innere Med., 1903, p. 415. ²Zeit. f. klin. Med., Bd. xlix, Hefte 1-4.
³Lancet, July 12, 1902.

O. Schaumann¹ contributes an interesting study of the **frequency and clinical importance of differences in the pupils**, with some special remarks upon so-called "springing mydriasis." The latter indicates the condition in which at times one pupil is larger than the other, and in which at other times the conditions are reversed. After an extensive review of the literature, he reports the results he obtained from about 2 years' study, carried out under carefully regulated conditions, upon 1186 cases in the Polyclinic, of which 331, or 27.9 %, showed differences in the pupils. He also studied ward-cases to the number of 723. Of these, 273, or 37.8 %, showed inequality. This shows that inequality is extremely frequent in internal disease. It is equally frequent in men and in women. The left pupil is a little oftener the larger than is the right. The kind of cases in which this condition was observed varied. Neurosis was the most common class, including neurasthenia, hysteria, epilepsy, chorea, neurosis of the stomach, exophthalmic goiter, etc. **Neurasthenia was the most common diagnosis.** Inequality was also seen in diseases of the lungs and of the heart and the vessels, and in a few acute infectious diseases. In a very large proportion of the cases no anatomic explanation for the condition could reasonably be suspected. It was even more common in simple neurosis than in organic disease of the nervous system. The author observed springing mydriasis in 11 cases. He does not believe that it is always an indication of oncoming organic disease. Of itself, it apparently is of no great importance. Schaumann does not believe in a "**physiologic inequality**" of the pupils. He thinks that there is some pathologic explanation for all those cases in which the origin of the condition cannot be determined.

Gordinier² discusses the symptomatology of aortic aneurysm, and reports a series of cases, several of which present interesting points. In one, there was paroxysmal dyspnea with marked prominence of the veins; but the **most striking symptoms were spinal**, consisting in spastic gait, paresis of the legs, and increased patellar reflexes. Death occurred from rupture of the aneurysm into the pleura. The aneurysm had eroded the bodies of 3 dorsal vertebrae and had compressed the spinal cord. In another case there were severe attacks of pain, with dyspnea and cyanosis; but there was an absence of murmur, and the case suggested mediastinal tumor. In still another case the sole complaint was of severe epigastric pains, for which it was necessary to use morphin. Otherwise, the man was well nourished, and no striking signs were present. He died suddenly with hemorrhage from the intestine and mouth. An aneurysm of the transverse and descending aorta was found, and this had ruptured into the esophagus. [It is a good rule to suspect aneurysm strongly when there is persistent or recurrent chest-pain or dyspnea of obscure cause, any time after early adult life.]

Dorendorf³ directs attention to a symptom of aneurysm that he considers important and that has been but little discussed. This is the **disappearance of the groove above the left clavicle**—the groove,

¹ Zeit. f. klin. Med., Bd. xl ix, Hefte 1-4.

² Albany Med. Annals, Aug., 1902.

³ Deut. med. Woch., July 31, 1902.

indeed, being often replaced by a prominence, which can be reduced by gentle, continuous pressure. This is due to compression of the left anonymous vein. In cases of mediastinal tumor there may be the same prominence, but it is usually distinguishable by the fact that it is bilateral. Emphysema may also cause a bilateral prominence.

M. Litten¹ insists that the observation of **pulsation transmitted by a sound introduced into the esophagus** is not sufficient evidence of the presence of an aneurysm, and refers to a case of carcinoma of the esophagus in which this sign was observed. He also emphasizes the fact that difficulty in swallowing is a not uncommon symptom in aneurysm.

H. B. Whitney² reports a series of 4 cases in which there was dulness under the manubrium and particularly to the left of it. In 2 of these instances autopsy showed that **enlarged glands** had probably been the cause of this dulness. The author speaks of the difficulty in distinguishing the dulness in some of these cases from aneurysmal dulness. He refers to the fact that there is likely to be a prolonged vertical zone, unlike that produced by aneurysm. Apparently this is usually situated chiefly on the left; while aneurysm usually is chiefly on the right. The outline is also more diffuse than in aneurysm.

H. Walsham³ reports 2 cases of aortic aneurysm with **transverse position of the heart**. He believes that this is a common condition in aortic aneurysm; and that when it is found and no other explanation is apparent, it is a valuable sign of aneurysm of the aorta, even if other evidences of this condition are lacking.

Von Schrötter⁴ reports the case of a man of 45 who was first seen because of **abscess of the septum**. His carotids were noted to be extremely tortuous and wide. This led to the examination of the cardiovascular system. A fluoroscopic examination showed a large pulsating shadow, which could be attributed only to an aortic aneurysm. Subsequently the left vocal cord showed a slight degree of paralysis.

A. R. Edwards⁵ reports a case of severe, probably pernicious, anemia, associated with marked general and coronary atheroma, and with a **diffuse and extremely distinct pulsation** of the lower part of the left side of the chest. This was so vigorous and so markedly expansile that a diagnosis of aneurysm was made. The postmortem examination showed **no explanation for the pulsation**. It is mentioned that Lafleur, in discussion, noted a similar ease seen by him, in which the autopsy showed gastric ulcer; but in which, during life, there was pulsation of the chest, with hematemesis, paralysis of the left vocal cord, and other symptoms of aneurysm.

M. Halpern⁶ reports 2 cases of aortic aneurysm treated with subcutaneous **injections of gelatin**. He believes that the effects were harmful, rather than good; and, at any rate, inclines to the view that the injections have no good effect.

¹ Deut. med. Woch., Nov. 27, 1902.

² Amer. Med., April 25, 1903.

³ Lancet, May 9, 1903.

⁵ Am. Jour. Med. Sci., Oct., 1902.

² Wien. klin. Woch., 1902, No. 38.

⁴ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

Embolism.—J. N. Hall¹ reports a case of embolism of the **bifurcation of the aorta** in a man of 37 that had valvular heart-disease. While sleeping, he was suddenly awakened with dreadful pain in the legs, both of which became blue and cold. Only an extremely feeble pulsation could be felt in the femoral arteries, and this soon ceased. The patient died about 36 hours after the beginning of the attack, the legs having become black. An autopsy could not be obtained.

Alkanus² reported to the Berlin Medical Society a case of embolism of the **superior mesenteric artery** in which death occurred with the symptoms of a suddenly oncoming peritonitis, and in which the necropsy showed that the embolus had been derived from a cardiac aneurysm.

Thrombosis.—Baumgarten reports some experimental work concerning the **fate of the blood in portions of vessels that are ligated** at 2 points. The chief important points in his results are that he found that the red cells persist for as long as 3 months, without any noteworthy change. Some, however, become smaller. After this time they begin to lose color. There was no evidence of fibrin-production and no production of hematogenous pigment, except in the neighborhood of the ligature. The white cells showed the formation of fat-droplets a few days after the operation. They gradually, however, underwent atrophy. The conclusion to be drawn from these observations is that the changes occurring within the vessels after double ligation are entirely different from those in blood that has extravasated. In connection with the question of the cause of coagulation, this is important; because it is further invaluable evidence of the **close relation between destruction of the blood-cells and coagulation.** Changes did, however, occur in the protoplasm of the cells. The author does not consider that these protoplasmic alterations are the sole cause of coagulation. He believes that the main cause that produces the onset of coagulation is an alteration in the vessel-wall.

P. S. Hichens³ reports a case of **thrombosis of the cerebral sinuses**, following chlorosis, in a girl of 18. The patient had localized headache in the frontal region; increasing stupor, which finally reached entire unconsciousness; vomiting; dilation of the pupils; and bilateral optic neuritis. She was in a very grave condition for 30 hours. After 5 days she became conscious again; and a week after this, the cerebral symptoms had disappeared entirely. The changes in the eye-grounds disappeared more slowly. Two weeks later there was a slight rise of temperature, and thrombosis of the right femoral vein occurred. There was also an attack of marked albuminuria associated with lumbar pain, but this soon disappeared. The patient entirely recovered. [This condition has now been reported sufficiently often to make it of some importance. The diagnosis is usually difficult to establish securely; but venous thrombosis occurs so often in chlorosis, and is dangerous in so large a proportion of cases, that it may well be thought of when there are obscure symptoms referable either to the head or the limbs.]

¹ Med. Rec., July 26, 1902.

² Zent. f. innere Med., March 28, 1903, p. 335.

³ Lancet, July 26, 1902.

Obstruction of the Venæ Cavæ.—A. Meyer¹ reports a case of **complete fibrous obstruction** of both the superior and the inferior vena cava in a boy of 18 years, and says that it is the first case of this condition on record. The most striking symptoms had been the marked ascites, with some swelling of the lower extremities and edema of the thoracic cavities; there was also some dilation of the veins of the upper and lower extremities and of the neck and back. The boy was **considered to have pericardial adhesions**, but the postmortem examination showed that these were absent. The point of chief interest was that the superior cava, at a distance of 6 cm. from the auricle, ended in a complete atresia, there being **no evidence of inflammatory processes** at this point. The inferior cava showed complete atresia at the diaphragm, there being some dense fibrous tissue, 1 cm. or more in thickness, at its termination. The gross and the microscopic conditions led to the belief that the disease was congenital. The author refers to the fact that this case demonstrates the entire incorrectness of the earlier view that obliteration of important veins is almost inevitably followed by gangrene. He cites the literature regarding similar cases.

DISEASES OF THE RESPIRATORY SYSTEM.

GENERAL CONSIDERATIONS.

J. Marek² reports an experimental investigation concerning the **origin of normal and abnormal respiratory sounds**. He states that he has shown definitely that the lung-tissue, whether inflated or collapsed, does not modify the pure tone transmitted from the air-passages. It, however, does modify abnormal sounds, making them deeper and softer. When the bronchi become filled with solid exudate, the lungs no longer have the power to modify these sounds. In the latter case the lungs become even **poorer transmitters of sound than the liver**. The changes in the sounds in the lungs are due to the resonance set up in the bronchi, which act as do other tubes. The **vesicular murmur** can, the author considers, originate only in the true respiratory portion of the lung. It is not merely a transmitted sound from the larynx or the larger bronchi, and must occur at the point where the terminal bronchi join the infundibula—a point where a small tube empties into a large space. It, then, constitutes practically a stenotic murmur. **Bronchial breathing**, Marek insists, is purely dependent upon the occurrence of a laryngeal sound and upon the transmission of this sound. He mentions a number of experiments to show that the absence of a larynx or of its action makes bronchial breathing impossible. As to the occurrence of bronchial breathing, if the lung-tissue around the walls of the bronchi has become empty of air, the walls of the small bronchi become more tense. As a consequence, the overtones accompanying the ground-tones are less weakened than they are normally, and the same is true of the somewhat ringing resonance of the larger bronchi. Hence, these sounds are heard. That they shall

¹ Med. Rec., May 23, 1903.

² Deut. med. Woch., Aug. 21 and 28, 1902.

be heard, however, it is necessary that the bronchi be unobstructed. Bronchial breathing can be heard over a normal lung if the laryngeal sound is sufficiently strengthened. The **metallic bronchial breathing and cavernous breathing** heard over cavities and pneumothorax are due to the passage of air from small passageways into larger spaces, the sound either being the transmitted laryngeal sound or occurring at the points where the small passages empty into the large spaces. As to the **causation of rales**, the author states that the mere bursting of bubbles in fluid, no matter how large these bubbles may be, causes only an almost inappreciable sound; and that rales cannot be due to such a cause. If, however, one attaches glass tubes to a rubber bulb, fills the tubes partly with fluid, holds them in a horizontal position, and sets the fluid in motion by sucking in air, waves will occur in the fluid and will travel up the tubes; and, at the moment that the tubes become closed by these waves, there will be a sudden spurt of the fluid in the direction of the stream of air. This produces a sound exactly similar to a rale. If the fluid is very sticky, the entrance of air often does not set up waves and cause momentary occlusion of the tube, but carries the fluid suddenly away from the wall; and this causes a sound like a rale.

C. F. Hoover,¹ in discussing the origin of the vesicular respiratory sound, reports a case in which there was violent cough in an old man; and in which it was noted that auscultation during the attacks of coughing showed a loud respiratory murmur over the lungs, which, though short in duration, had plainly the characteristics of vesicular breathing. Part of the lung showed pneumonic infiltration; and over this area, during contraction of the diaphragm, rales could be distinctly heard. It was perfectly clear that during these spasms of the diaphragm the glottis was tightly closed. The author believes that these observations show that there was movement of the air in the respiratory tract toward the infundibula, as the **result of the rarefaction of the air** in the trachea and the large bronchi; and he thinks that the observation offers absolute **proof of a true vesicular respiratory sound**.

H. L. Barnard² discusses the **simulation of acute peritonitis by diseases of the lung** and of the pleura, describing a number of cases that show the difficulty of diagnosis in such instances. In a girl of 11 years with right-sided diaphragmatic pleurisy and subsequent signs of pneumonia, the symptoms were practically characteristic of appendicitis with peritonitis. In a boy 10 years old with a right-sided pleuropneumonia it was associated, before the lung-signs became evident, with severe abdominal pain and vomiting. In one case of traumatic pleurisy with signs of injury of the spleen, laparotomy was undertaken without discovering any abnormal abdominal condition; also in a case of gastric ulcer in a girl of 17 who was taken suddenly with bilateral pneumonia and right-sided diaphragmatic pleurisy, associated with severe epigastric pain and collapse. The diagnosis is difficult, but the following are some of the **points that may make a correct diagnosis possible**: While the abdominal wall feels extremely tense, one will often notice a distinct

¹ Jour. Am. Med. Assoc., Sept. 27, 1902.

² Lancet, Aug. 2, 1902.

inspiratory relaxation; also, in diaphragmatic pleurisy, the costal respiration is more marked on the affected than on the unaffected side; likewise, the increase in the frequency of respiration is out of proportion to the increase in the pulse, in the thoracic diseases; and there is often a peculiar catch at the end of inspiration; then, too, the tenderness of the abdomen in such conditions is often chiefly superficial, while deep pressure is often possible.

P. Hampeln¹ describes 2 cases of rapidly fatal pleurisy; one of seropurulent pleurisy, with recovery; and also one fatal case of pneumonia and one that recovered,—in all of which the symptoms at the onset of the attack were those of violent peritonitis or occlusion of the intestine, while the symptoms and physical signs of the actual disease were absent. The physical signs, however, appeared after a short time. He describes some other cases in which the clinical appearance made it probable that similar conditions existed. The severe abdominal symptoms are attributed chiefly to the irritation of the phrenic, the irritation being readily reflected to the vagus and the splanchnic. [We have knowledge of several cases in which operation for supposed acute abdominal disease was undertaken because of symptoms such as those described above; and in one that was fatal (pneumonia) the result was perhaps determined by the operation. The importance of correct recognition of the condition present needs no emphasis.]

W. A. Briggs² refers to 3 cases in which somewhat **odd anomalies of respiration** occurred while in high altitudes. He believes that these anomalies were due to the high altitude, but was unable to determine whether there was any definite pathologic condition that would explain their incidence.

Lengsfelder³ reports a case of **congenital defect of the pectoral muscle**, the sternocostal and the abdominal portion of the right pectoralis major being absent, while the clavicular portion was hypertrophic. The patient had had repeated attacks of pleurisy and pneumonia on the right side. The author believes that the abnormality of the pectoral muscle had led to imperfect respiration on this side and to a consequent predisposition to inflammatory processes.

R. P. Elmer⁴ describes a **new reducing cyrtometer**, which he considers to be accurate, and which will rapidly make a graphic record of the thoracic outline. In a later paper he directs attention to a source of error in the instrument.

BRONCHITIS AND ASTHMA.

G. Rosenfeld,⁵ in discussing some causes of **cough and coryza**, refers to the hay-fever type of disorder and to the plants that produce this, and reports a case in which it was noted that the patient, a woman, always began to cough as soon as she returned from her summer outing.

¹ Zeit. f. klin. Med., Bd. xlv, Hefte 5 u. 6.

² Amer. Med., May 23, 1903.

⁴ Phila. Med. Jour., Jan. 3, 1903.

³ Wien. klin. Woch., 1902, No. 49.

⁵ Berl. klin. Woch., March 2, 1903.

She devoted herself to the care of a pet gray parrot, and it was found that the bird was moulting at the time and that there were numerous granules and fine pieces of feathers covering its body. The woman was **kept away from the parrot** for some days, and her cough entirely disappeared. When she again began to take care of the bird, the cough returned. The author suggests that similar conditions may at times be the cause of obscure and intractable coughs.

H. Hochhaus¹ discusses the **pathology of fibrinous bronchitis**, reporting a case that he investigated both clinically and anatomically. The masses expectorated consisted of mucus, and not of fibrin. Their origin was in the dilated bronchi of one upper lobe, the lung-tissue in this region being, through chronic inflammation, transformed into dense, fibrous masses. The bronchial walls showed severe inflammation, but the epithelium was retained. The author believes, with Fraenkel, that fibrinous bronchitis, bronchial asthma, and obliterating bronchiolitis constitute a **group of closely related affections**, all of which are characterized by severe inflammation of the fine bronchi.

J. R. Harris² reports 3 cases of fibrinous bronchitis, and discusses at length the nature and the causation of the condition. He concludes that all cases of this disease are the result of **congestive or low inflammatory, edematous exudation** from the serous lining of the respiratory bronchioles, infundibula, and alveoli. The casts are deposited on the surface of the tissues mentioned, layer by layer. The cause of the changes in the respiratory tissues is, as a rule, **engorgement of the pulmonary circulation**, due to temporary or permanent incompetence of the left ventricle, associated with competence of the right ventricle. Vasomotor influences may sometimes produce the condition, when bronchial disease is already present. [It is difficult to conceive of circulatory incompetency as very active in the cause of the condition, because it is so extremely rare in cases of marked heart-failure associated with chronic bronchitis. Circulatory incompetency is common in cases of fibrinous bronchitis, but may well be an effect as well, perhaps, as a partial cause.]

Gärtner³ recommends the use of **intravenous oxygen infusions** in cases such as those of foreign body in the lung, membranous croup, bronchiolitis, widespread pneumonia, illuminating-gas poisoning, and asphyxia of the newborn, in which it is essential to supply large amounts of oxygen to the tissues rapidly. This method of administration has, so far, been used solely in animals; but it is, the author believes, practicable.

Campanella⁴ reports excellent results from the hypodermatic injection of **increasing doses of atropin** in asthma. This drug relieves the dyspnea and also decreases the bronchial secretion. The author, therefore, believes that it has both a palliative and a curative action. Idiosyncrasy to atropin is very common, and should be carefully watched for. The author thinks that a vegetable diet increased the tolerance to the drug. [Atropin in large doses undoubtedly affords great relief in a large proportion of cases of bronchial asthma.]

¹ Deut. Arch. f. klin. Med., Bd. Ixxiv, 1902.

² Intercol. Med. Jour. of Australasia, Aug. 20, 1902.

³ Wien. klin. Woeh., 1902, No. 27 and No. 28. ⁴ Gaz. degli Osped., No. 69, 1902.

PULMONARY SYPHILIS.

A. Stengel¹ gives a general discussion of **syphilis of the lung** simulating pulmonary tuberculosis. He refers to the literature of the subject and reports the postmortem conditions in a case in which syphilis of the lung was thought to be present. He divides the condition into gummas, changes in the connective tissues, and changes in the parenchyma. He thinks that our present knowledge of the lesions of pulmonary syphilis does not warrant any more positive statement concerning the symptoms of the condition than that when there is a certain history of infection and syphilitic lesions are found in other organs, any evidences of pulmonary disease should be thought of as **indications of possible syphilitic disease** of the lungs, particularly if repeated examination of the sputum shows the absence of tubercle bacilli. The diagnosis cannot be made with certainty, and the condition clinically may be practically identical with tuberculosis. There is more tendency to severe stenosis of the trachea or of the main bronchus in syphilis than in tuberculosis, and emaciation is usually less pronounced in the former than in the latter. Syphilis shows a somewhat greater tendency to assume a stationary stage; and signs of syphilis elsewhere are, of course, not infrequently met with. The recovery of a patient under antisyphilitic treatment is not always an indication that the case has been one of pulmonary syphilis, although this adds greatly to the presumptive diagnosis.

H. W. Berg² insists that pulmonary syphilis is much more common than it is usually recognized as being. He believes that pulmonary syphilis is **frequently the starting-point of tuberculosis**; that even though tuberculosis is demonstrated to be present, one may be justified in diagnosing the existence of syphilis of the lung; and that the latter may be the primary disease. He considers, therefore, that one is frequently justified in using large doses of iodids, when there is suspicion of syphilis or just reason for believing that the patient is syphilitic. The effect of treatment will soon demonstrate whether it should wisely be continued or not. [The use of large doses of iodids in pulmonary tuberculosis is so often attended by serious increase in the rapidity of progress of the tuberculosis that one is not justified in using this method of diagnosis unless there is good and reasonable suspicion that syphilis rather than tuberculosis is present.]

PULMONARY CALCULUS.

Fiessinger³ reports a case in a man of 34 years, who presented the **signs of chronic pneumonia** on the right side, with severe cough. The condition resisted treatment; and after it had lasted from November to April, the patient suddenly ejected a **round calculus**, somewhat irregular in shape. After this, there was gradual but ultimately complete recovery. The calculus was found to be composed of carbonate and phos-

¹ Univ. of Pa. Med. Bull., May, 1903.

² Med. Rec., Dec. 13, 1902.

³ Jour. de Méd. de Paris, July 20, 1902.

phate of lime and magnesia, there being an abundance of the latter. The author also mentions another case, in which there was hemoptysis and had been local peritonitis. The hemorrhage came on suddenly and was followed by a second. With the latter, a yellowish calculus was ejected. A few days later other calculi were coughed up. After this there was rapid disappearance of the pulmonary signs. The treatment of such conditions is entirely symptomatic.

PLEURISY.

C. L. Greene¹ describes a **percussion-sign** of pleuritic effusion hitherto unnoted. This consists in percussion of the free cardiac border during full inspiration and again during forced expiration, the patient either standing or sitting. It will be noted that the border is displaced outward by the expiratory movement in cases of pleuritic effusion. This may also be noted with the fluoroscope. Percussing the upper border of flatness posteriorly will show, at the same time, a well-defined rise of the fluid on full expiration, coincident with the outward displacement of the heart.

F. H. Edgeworth,² in discussing some of the **unusual initial signs** of pleurisy, mentions **hemoptysis** as an occasional sign lasting only a day or two and of doubtful cause, infarct and pneumonia being apparently out of the question. He believes that it is probably due to hyperemia and rupture of the capillary vessels immediately underneath the inflamed area of the pleura. It has no special prognostic importance. He also refers to the fact that pain often radiates along the intercostal nerves, and is likely to give rise to error for this reason. Referring to the tenderness over the nerves, he states that this is a comparatively late phenomenon in neuralgia, but that it occurs quite early in **arthritis of the costovertebral joints**—a condition that he has observed in 2 cases. In this disorder, however, the tenderness is quite close to the spinous processes, and is chiefly distinguished by this fact.

G. B. Miller³ discusses **postoperative pleurisy and its relation to pulmonary embolism**, with especial reference to 8 cases—the histories of which are given—that occurred in the gynecologic clinic in Johns Hopkins Hospital. He believes that in these cases the pleurisy had its origin in an infarction, though the presence of a pulmonary embolus could not be demonstrated. His reasons for this belief are: that the pleurisy was limited in area; that the symptoms appeared suddenly; that recovery was rapid; that most of the patients were operated upon for carcinoma or myoma; that the pleurisy came on within 3 weeks after the operation; and that in most cases the patients showed phlebitis, or had pulmonary embolus, which was of large size and which gave rise to unmistakable symptoms. None of the patients were thought to have bronchopneumonia. The author believes that his study of these cases and of the literature indicates that pleurisy may be the result of pulmonary em-

¹ N. Y. Med. Jour., Aug. 9, 1902.

² Bristol Med.-Chir. Jour., March, 1903.

³ Amer. Med., Aug. 2, 1902.

bolism, particularly after operation or labor, when no other cause is evident. The occurrence of such a condition should warn one of the possibility of a subsequent fatal pulmonary embolism, and should make one very cautious about allowing the patient to make any movements for some time after operation.

P. Carlet¹ gives a general discussion of **biliary pleurisies**. Biliary infections have come to be looked upon as often giving rise to infections in neighboring organs, as well as in organs at a distance. At times, pleurisy occurs in connection with numerous diseases of the biliary passages. It is comparatively common in acute catarrhal angiocholocystitis and in ordinary catarrhal icterus. In such circumstances it is usually of a very favorable course. Sometimes it occurs during the attack, and sometimes afterward. The presence of bile in the effusion is not often noted except in right-sided pleurisies. The relation of the disease to symptoms of disease of the biliary passages distinguishes it from tuberculous pleurisy—the **chief point in the diagnosis**. Acute purulent angiocholocystitis is not commonly complicated with pleurisy, but the pleura may be infected directly or through perforation of the diaphragm. Pleurisy may also occur in the course of simple chronic cirrhotic or lithogenous angiocholocystitis. It is not usually exudative in character. When it occurs in connection with gallstones, it commonly appears after the attack. All these pleurisies arise in the same way as does appendicular pleurisy, and their severity is dependent upon that of the original condition producing the pleurisy. They are usually right-sided.

S. Mutermilch² reports the case of a child of 5 months, suspected of having a pleural effusion, in which an exploratory puncture showed a **milky effusion**; 115 cc. of fluid was afterward withdrawn. Microscopically it showed numerous very minute granules, which exhibited molecular motion; some larger granules; occasional white cells; a few large cells, exhibiting clear, glistening granules in their protoplasms; and a very few red blood-cells. Osmic acid caused the fluid to become dark; ether caused it to clear up somewhat, and almost entirely if a little alkali were added. The fluid contained over 8 % of solid residue, which chiefly consisted of albumin. There was about 1.5 % of ethereal extract, about one-tenth of this being cholesterol. The fluid was, therefore, undoubtedly an actual fat-emulsion. The author then gives a discussion of **hydrops adiposis and hydrops chylosus**. He considers that the only satisfactory method of distinguishing between these two conditions is the microscopic one. The chylous fluids are characterized by the presence of numerous very minute fat-granules (fat-dust), with very marked molecular motion. Large granules are but sparsely present, and actual fat-drops are exceptionally seen. In the chyliform fluids—the so-called fattily degenerated exudates—the granules are larger and fat-drops are common. Cellular elements are uncommon in the chylous fluids and common in the chyliform. A determination of the relative amounts of lethecin, cholesterol, and fat provides no satisfactory distinctions between the conditions. The same is probably true of Paton's method of deter-

¹ Thèse de Paris, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Heft 1-4.

mining the relation between the cholesterol and the albumin. Mixed forms are not very uncommon.

F. Delafield¹ discusses the **treatment of pleurisy with effusion**, and presents the records of 200 cases seen in recent years. He emphatically insists that the treatment should be very early and, if necessary, repeated tapping; as he considers that in this way pleurisy may be rapidly controlled, while with medication the condition is likely to persist for weeks. Tapping was done once in 142 cases, twice in 45, 3 times in 9, and 4 times in 4 cases. The author notes that cases with bloody or turbid serum do as well as those with clear serum. [This paper is an impressive one and is a striking contrast to the teaching of some authors not long since, that tapping acute pleurisy should be avoided as far as possible for fear of causing rapid onset of pulmonary tuberculosis. Our own practice has been the more common one—tap at once if there are urgent indications. Otherwise wait a week or two; then tap if not absorbing, and, if necessary, repeatedly. The question deserves general attention.]

H. W. Allen² reports a case of **albuminous expectoration following thoracocentesis**. The accident occurred after removing 3100 cc. of fluid. Severe paroxysms of cough occurred, and were followed by a profuse expectoration of serous, frothy sputum. The patient recovered.

A. J. Patek³ reports a case of **albuminous expectoration** following thoracocentesis, about 3 liters of fluid having been removed. Improvement soon occurred and the patient recovered.

Vaquez and Quisome⁴ discuss the treatment of recurrent pleural effusions by **injections of sterilized air**. They describe an apparatus by means of which, as the fluid flows from the pleural cavity, air is allowed to enter and take its place. The apparatus is simple, consisting only of a trocar, which is armed with a Y-shaped tube. One branch of the latter is connected with a Potain syringe; the other, with a flask, which is stoppered with cotton. The whole apparatus is carefully sterilized. When it is used, as the fluid passes out through one branch of the tube, air passes in through the other. As a rule, about half a liter of air is sufficient. The air produces a pneumothorax, which is gradually absorbed. The authors report several cases in which persistently **recurring pleural effusions have been cured** by this method.

M. H. Fussell and D. Riesman⁵ discuss **spontaneous nontuberculous pneumothorax**, reporting 2 cases. In the first, that of a woman of 21, a severe pain awakened the patient from her sleep. She had at this time, also, distressing dyspnea; and was found to present the signs of an effusion into the left chest with dulness on percussion, the dulness being replaced next day by a resonant note. She then exhibited the signs of pneumothorax. Her temperature was normal. Her chest was aspirated, but only air was found. She speedily recovered after this; and when the case was reported, 7 years later, she was well. The second case occurred

¹ Am. Jour. Med. Sci., Dec., 1902. ² Johns Hopkins Hosp. Bull., Jan., 1903.

³ Amer. Med., Aug. 23, 1902.

⁴ Gaz. hebdom. de Méd. et de Chir., No. 43, 1902.

⁵ Am. Jour. Med. Sci., Aug., 1902.

in a man of 27 who had cough and pain in the right side. Just before admission to the hospital he had had a violent fit of coughing, followed by pain in the right side; and on admission he was found to have pneumothorax. The condition rapidly improved; and a week after admission the patient was discharged. Three months after admission he was seen, and was entirely well. Among the points noted are that pneumothorax may last for only a few days, but its effects may persist for some weeks. At times it persists longer, and in one case it had lasted for 9 years. The exciting cause is usually violent muscular action; but at times the condition comes on during absolute quiet or even during sleep, as in one of the cases reported in this paper. Pain is the most common symptom, but all marked symptoms may be absent. Fever is not a marked symptom. The physical signs may appear only gradually. The authors emphasize their belief that there is a spontaneous pneumothorax, which has no relation to tuberculosis or other recognizable disease of the lung. They believe that it occurs as the result of the **rupture of an emphysematous vesicle**. The condition is very difficult to distinguish, as exemplified by a third case reported, in which a spontaneous pneumothorax was at first thought to be present, but in which the primary condition was subsequently found to be sarcoma of the lung. The authors consider aspiration a certain and safe means of relief, and think that it should be resorted to in severe or prolonged attacks.

J. Morvan and P. Cornet¹ report a case of pyopneumothorax that presented, during life, the characteristics of tuberculosis; but that, at necropsy, was found to have **had its origin in a bronchiectasis** at the base of the lung—a very rare cause of pyopneumothorax. There had been a rupture of the dilated bronchus into the pleura. In such circumstances a diagnosis might be of importance, as surgical treatment might relieve the condition.

DISEASES OF THE DIGESTIVE SYSTEM.

DISEASES OF THE MOUTH AND THROAT.

J. C. J. Bierens de Haan² discusses an **epidemic of ulcerative stomatitis** that occurred during the South African war, among the Boer troops and other persons that came into contact with these troops. The condition was evidently contagious; for it rapidly spread throughout an entire commando, and other commandoes became infected when they came into contact with the first. Families coming into contact with the infected commandoes also acquired the condition; while those that did not have an opportunity for direct infection, but that otherwise lived in entirely similar circumstances, were not infected. Besides, the Kaffirs, who lived in similar circumstances, but rarely came into contact with the Boers, did not contract the disease. The opportunity for infection was frequently given, because the Boers were accustomed to eating from one general

¹ Gaz. hebdom. de Méd. et de Chir., No. 64, 1902.

² Deut. med. Woch., Feb. 12, 1903.

dish of food. The coarse meal that they used as food was sufficient to provide a predisposing cause, because it could readily damage the mucous membrane; but the epidemic was **apparently associated with a lack of salt**, and began to disappear as soon as a proper supply of this had been obtained. The disease apparently did not arise about the gums; the hard and soft palates and the pillars of the pharynx were most frequently affected, the jaws and cheeks less frequently. The gums were usually swollen. General symptoms were not commonly very marked, but were sometimes severe. There was no evidence that the condition was foot-and-mouth disease. Bacteriologic investigations could not be undertaken. The disease readily responded to treatment with mild antiseptic mouth-washes, the most satisfactory of these being 1 : 4000 potassium permanganate.

Hauszel¹ contributes some observations concerning **sialolithiasis**. In the first case reported inflammatory changes in the glands were responsible for the condition, through producing stagnation of secretion. Bacterial influences were probably absent, as bacteriologic examination was negative. The possible causes of the inflammation in the gland were trauma and the slow metabolism of old age. In the second case a stone was formed in the duct, as the result, the author thinks, of inflammation. In the third the symptoms were those of a stone produced in the gland. The diagnosis is suggested by the occurrence of inflammatory signs about the gland, followed by periodic attacks of pain, and subsequently by symptoms of the stagnation of saliva with frequent change in the size of the tumor.

G. Nash² reports an outbreak of **sore-throat produced by milk**. He observed 42 persons that were members of 22 families. All of them had severe sore-throat, with marked swelling of the tonsils and other tissues, and with frequent ulceration. The local condition was complicated with fever, headache, general pains, and marked weakness. All these persons had drunk milk from one farm. Those that had taken the milk after it had been boiled had no symptoms. No explanation for the infection could be found in the dairy.

Treitel³ insists upon the importance of **increased excitability of the vomiting reflex**, resulting from local disease of the throat or nose, in causing the continuance of a preexisting tendency to vomiting, particularly in neurasthenic subjects. He claims very frequent good results from the local treatment of these parts, either by operation or otherwise. He insists that gargling should be strictly forbidden in these cases, and states that the excessive irritability can be reduced to a considerable extent by taking a mouthful of cold water and holding the head back without swallowing.

¹ Wien. klin. Woch., 1903, No. 1.

³ Arch. f. Verdauungskrankh., viii, 3.

² Lancet, Oct. 18, 1902.

DISEASES OF THE ESOPHAGUS.

M. Lewinson¹ discusses **atonic dilation of the lower end of the esophagus**, reporting a case. The diagnosis was based upon the fact that when the stomach-tube was introduced into the lower portion of the esophagus, one could always draw off a large amount of retained fluid and food, which was of entirely different character from that of the gastric contents. It was certainly not a diverticulum, because the stomach-tube could always be passed through the cardia without any special trouble. The author also tried Rumpel's test. He refers particularly to the **errors that may be associated with the use of this test**. For instance, the diverticulum may be associated with dilation; and the tube introduced into the esophagus may lodge in the dilation, and not in the diverticulum, thus leading to an erroneous diagnosis. The tube that is supposed to be introduced into the stomach, also, may curl up in the dilation, and thus lead one into the mistake of thinking that it has entered the stomach. It is evident, then, that the method is subject to serious error, though often of much importance in establishing a definite diagnosis.

R. Kuckein² contributes an interesting description of 2 cases of **carcinoma of the esophagus** that exhibited the **clinical picture of aortic aneurysm**. Both cases exhibited **severe paroxysmal pain** of radiating character, closely resembling that seen in aneurysm. Their greater intensity at night might, perhaps, have suggested carcinoma; but pains of this character are so much more common in aneurysm than in carcinoma that they were considered to indicate the former. **Compression of the trachea**, also, was so marked in one case that it was believed to be a very strong sign of aneurysm. This might occur in carcinoma, but it is uncommon. This case likewise exhibited spasms of the larynx from involvement of the recurrent laryngeal nerve—a complication that is commonly said to be much more frequent in aneurysm than in carcinoma, although some statistics indicate that it occurs nearly as often in carcinoma as in aneurysm. **Interference with deglutition was absent** in these cases, owing to the fact that the growth had extended chiefly toward the periphery, and had ulcerated sufficiently internally to leave a clear passageway. About 15 % of cases of aortic aneurysm are, however, said to exhibit disturbance of deglutition; and a certain proportion of cases of carcinoma are known to have run their course without this symptom. Even dulness, prominence of the anterior part of the chest, and pulsation in that region, may occur in tumors of the mediastinum; and such pulsation was present in one of these cases. The x-rays are now known to present only uncertain evidence of the presence of aneurysm; but the conditions in these cases were apparently very definitely in favor of aneurysm, since an **expansile pulsation was observed**. This was, however, due to the fact that the shadow of the aorta lay directly alongside of the shadow of the tumor, and the pulsation was that of the aorta itself.

¹ Berl. klin. Woch., Nov. 17, 1902.

² Deut. med. Woch., Nov. 20, 1902.

DISEASES OF THE STOMACH.

METHODS OF EXAMINATION.

W. Zweig,¹ in a study of the value of **Sahli's method** of investigating the gastric function, refers to the fact that the results are disturbed by anything that interferes with the homogeneous mixture of the test-meal. This occurs in a large proportion of cases of chronic gastritis and motor insufficiency. Also in cases of subacidity and anacidity investigation by means of this meal is of little value, since the meal itself produces little secretory irritation; and since HCl may be found absent after its use, when it is present after that of the ordinary test-breakfast. The method is also complicated, and its use takes much time. It has **little value for the practitioner.** The chief value that it may prove to have is in relation to nervous dyspepsia, in demonstrating the presence of functional disturbances; particularly in distinguishing between atony and alimentary hypersecretion. Burger, in discussion, emphasized the presence of two other errors in using this method; one of them is the absence of the act of mastication; and the other, the use of fat in such large quantities. Both are abnormal conditions, and both would reduce the acidity. Hence, the results obtained by this method, even in determining functional disturbance, would be unreliable.

A. L. Benedict² discusses the filtration of stomach-contents and the **changes in chyme due to delay in examination.** His method of filtration is first to centrifuge, then to remove the top layer with a cotton swab, to decant, and to filter by suction through ordinary thin filter-paper. This often greatly shortens the time necessary for filtration. The author also refers to the changes that take place owing to fermentation, if the stomach-contents are allowed to stand before examining.

Bönniger³ gives a discussion of the methods of demonstrating **lactic acid** in the stomach and of the test-meals that may be used in such work, and decides that the test-dinner cannot be used. Under ordinary circumstances it is sufficient to know that if a distinct chlorid-of-iron reaction is obtained after using a test-breakfast, it indicates lactic-acid fermentation; while, if a marked reaction is obtained with stomach-contents extracted after fasting overnight, this indicates the same. If the motility of the stomach is great and there is a suspicion of lactic-acid fermentation, the author recommends the use of Boas's oatmeal-soup, and extraction after from 2 to 2½ hours.

W. F. Skillman,⁴ in discussing the value of the **dimethylamidoazo-benzol test** for free HCl in stomach-contents, reaches the conclusion that if the test for lactic acid is positive, some other method should be used for free HCl; while if the stomach is normal as to size and position and the peristaltic function is unimpaired, Töpfer's reagent will give fairly accurate results. If there is any change in the position, size, or

¹ Zent. f. innere Med., 1903, p. 459.

³ Deut. med. Woch., Oct. 9, 1902.

² Amer. Med., Aug. 16, 1902.

⁴ Amer. Med., April 18, 1903.

peristaltic function of the stomach, Günzburg's or Boas's reagent should be also used.

R. Schorlemmer,¹ in an extensive study of the **albumin-digesting power** of the stomach-contents of normal and abnormal persons, and a coincident study of the usefulness of the **Hammerschlag and Mett methods**, reports the following results: Mett's method is the most practical and satisfactory of the quantitative methods for pepsin. It is easily carried out, and controls can be readily used. In order to obtain proper results, one should see that the specimens examined have an equal content of free HCl. The amount of the free HCl, as well as the amount of gastric contents used, the nature of the albumin employed, the period of digestion, and the temperature, affect the result. **Constant shaking movements** increase the digestive activity. The values in Mett's method in normal subjects, which have been published by Roth, are too small. There is no direct relation between the quantity of HCl and that of the pepsin, although more pepsin is secreted in hyperacidity than in an acidity. **Milk-curdling ferment and pepsin** do not run parallel courses. The ferment that persists longest is pepsin. Pepsin-determinations are important, because they give an indication for therapy; and because, when pepsin is found absent or nearly absent, this indicates the presence of a severe destructive process in the stomach.

E. Nirenstein and A. Schiff² discuss Mett's method for the determination of the pepsin in the stomach-contents, and report a series of observations that they believe to indicate that there are present in the gastric contents substances that interfere with the activity of the pepsin. They find that **diluting the stomach-contents** 16 times overcomes the activity of these interfering substances; and that the results are after such dilution theoretically, as well as practically, correct. They therefore recommend that, in carrying out the method, the gastric contents be diluted 16 times. Unless this is done, they think that the results are unreliable.

A. Hammerschlag³ replies to Schorlemmer's criticisms of his method for determining pepsin quantitatively, and gives a detailed answer; he also gives a detailed criticism of Schorlemmer's work. Schorlemmer, in the same number, gives a detailed response to Hammerschlag.

Franz A. R. Jung⁴ has made some comparative studies of the methods of Mett and Hammerschlag for the determination of the pepsin in the gastric contents. He finds that the **amounts of pepsin and of HCl do not constantly run parallel**. As a rule, however, in subacidity and in acidity the pepsin is decreased, although less markedly than is the HCl. In hyperacidity, on the contrary, the pepsin shows high normal or excessive values. With Hammerschlag's method the values for pepsin and HCl run much closer to each other. The author believes that Mett's method gives the more satisfactory results. He describes

¹ Arch. f. Verdauungskrankh., Bd. viii, Heft 1-5.

² Arch. f. Verdauungskrankh., Bd. viii, Heft 6.

³ Arch. f. Verdauungskrankh., Bd. viii, Heft 6.

⁴ Arch. f. Verdauungskrankh., Bd. viii, Heft 6.

a series of results that show a relative change in the amount of pepsin, as compared with the amount of HCl. He believes that a study of pepsin should be combined with a study of HCl in order to obtain a satisfactory idea of the condition of the gastric contents.

T. Pfeiffer¹ contributes a study of the effect of various substances upon the **freezing-point and the acidity of the gastric contents**, thereby investigating the absorption from the stomach. He concludes that various factors, particularly the movement of the water through the wall of the stomach, indicate that absorption from that organ is not the result of mere diffusion. There are, however, physical factors at work; for the concentration of the gastric contents shows a direct relation to the concentration of the blood-serum, and, further, the gastric contents tend to reach a definite and constant concentration. The factors at work in absorption from the stomach seem, then, to be quite complicated; and they cannot, as yet, be entirely explained. A study of the effect of nervous influences would probably be of importance.

GENERAL CONSIDERATIONS CONCERNING GASTRIC DISEASE.

Von Mering² has had a series of experiments carried out in his clinic, concerning the **influence of various positions of the body** upon the motor functions of the stomach. His results were, in brief, as follows: The stomach was most rapidly emptied when the patient lay upon the right side or walked quickly about. Standing, sitting, and lying on the left side caused the stomach to be emptied much less rapidly; in all the latter cases, however, in about the same length of time. When the patient lay on the abdomen or on the back, the stomach was emptied in a medium length of time. Such results may be fair indications of normal conditions. They do not, however, indicate what would be the case in gastroptosis or in dilation, for instance; and it is impossible to draw from them definite conclusions as to treatment. It is, nevertheless, true that many persons with motor weakness of the stomach seem to be greatly relieved by lying on the right side after eating.

V. Otto³ discusses the **absorption of the alkaline iodids**, sodium salicylate, chloral hydrate, and strychnin, from the stomach. He states that sodium and potassium iodid are moderately well absorbed from the stomachs of guineapigs and rabbits, but very slightly from the stomachs of cats and dogs. Sodium salicylate showed rapid absorption from the stomachs of the guineapig and the rabbit, but no absorption for several hours in the cat and the dog. Strychnin was not absorbed from the stomachs of guineapigs and rabbits. It was rapidly absorbed and caused rapid poisoning when introduced into the stomachs of cats and dogs. All four of these species of animals absorbed chloral hydrate rapidly from the stomach. The results with potassium and sodium iodid and with sodium salicylate, on the one

¹ Arch. f. exper. Path. u. Pharm., Bd. xlviii, Hefte 5 u. 6.

² Therap. d. Gegenwart, No. 5, 1902.

³ Arch. f. Verdauungskrankh., Bd. viii, Hefte 4 u. 5.

hand, and with strychnin, on the other, are striking evidences of the differences between different species of animals, and demonstrate, in Otto's opinion, that **von Mering's teaching concerning absorption** from the human stomach has been improperly based upon animal experiments alone, and **may be incorrect**.

A. Kühn¹ has investigated a number of cases in which the **stomach-contents exhibited a green color** in the absence of bile-reactions. He has found in them large numbers of green-tinged cells that showed projections and were evidently **algæ**. These grew rapidly in the thermostat, producing a dark olive-green mass at the bottom of the vessel containing them. The cases in which they were found were exclusively those with excessive acidity, and the author believes that hyperchlorhydria and stagnation favor their growth—a somewhat remarkable fact, since ordinary algæ taken from stagnant water die if placed in water containing HCl. He thinks, also, that it is probable that these cases will be found to exhibit various forms of algæ, rather than one variety. They are probably introduced with the drinking-water and the food. Their **diagnostic importance cannot yet be stated**, but it is worth remembering that they were noted only in cases with hyperacidity.

A. Pettersson² discusses the **importance of fungi in relation to pathologic changes in the stomach**. He describes the case of a woman of 48 who had the symptoms of gastric ulcer followed by perforation, and who was operated upon and recovered. At the operation examination of the peritoneal fluid showed large numbers of yeast-like organisms, and these grew rapidly and freely on agar-plates. The organism proved to be Dematiu pullulans (de Bary). Fungi have rarely been found in peritonitic exudates, and the other cases in the literature are mentioned. This organism had no pathogenic power in animals when injected subcutaneously, intraperitoneally, or into the pleural cavity. Its possible activity in producing gastric changes was tested by feeding large amounts of the cultures to mice and guineapigs. No bad effects upon these animals were observed, and necropsy showed their stomachs to be in normal condition. The author thinks that **these fungi are probably not active** in the production of gastric symptoms. They are usually found in cases of hyperacidity, and a considerable degree of acidity furthers their growth.

P. Cohnheim³ contributes an article concerning **infusoria in the stomach and the intestinal tract** of man, and discusses the clinical importance of these organisms. He reports a series of observations of his own, reviews the literature of the subject, and reaches the conclusion that infusoria in the esophagus and stomach indicate strongly that there is carcinoma of the esophagus or stomach uncombined with any stenosis of the pylorus. The infusoria may, he believes, be the earliest and an **almost certain sign of carcinoma**. Living infusoria in the feces indicate primary chronic gastric disease, usually atrophic gastritis;

¹ Centralbl. f. innere Med., July 12, 1902.

² Deut. med. Woch., Sept. 25, 1902.

³ Deut. med. Woch., March 19 and 26, and April 2, 1903.

though they may be present purely as the result of severe enterocolitis. Encysted infusoria are found in the stools of normal persons that have previously had gastritis or gastroenteritis. Flagella and cilia **have no pathogenic importance**; they have merely a symptomatic and a diagnostic importance. As the result of the last statement, the author insists that it is not only of no use, but is also irrational, to employ substances that have a more or less toxic effect upon the tissues, with the idea of killing the infusoria. The accomplishment of the latter purpose does no good, and the substances used do actual harm to the tissues. [Indubitable signs of early gastric cancer are much desired but probably undiscoverable.]

M. I. Knapp¹ discusses a condition that he calls **gastrosia fungosa**, in which there is an excess of organic acid found in the stomach. In his opinion, this is due to mould-vegetation in the stomach. He refers to the symptoms of the condition, and describes a number of cases. He believes the diagnosis to be chiefly dependent upon the determination of the presence of large amounts of organic acids in the stomach, and also upon the demonstration that moulds are present.

M. I. Knapp² discusses a condition that he terms **organacidia gastrica**, which is due to the production of an excessive amount of organic acids in the stomach. He also refers to what he calls zymosis gastrica, which, he believes, is the result of the presence of growing yeast-cells in the stomach.

G. Gaglio³ has made an **experimental study of gastric hypersecretion**. He ligated the esophagus above the cardia and constricted it moderately. This produced continuous irritation of the wall of the esophagus, and resulted in continuous secretion of gastric juice, beginning a few hours after the operation, and lasting for several days, even when the animal received no food. When the ligature was cut, the gastric secretion ceased. The author also noticed, at the same time, that in these animals **symptoms similar to those of Reichmann's disease** were seen; viz., besides the gastrosuccorrhea, a mucous gastritis, spasm of the pylorus, a back flow of bile, an alkaline reaction of the urine, and constipation. The histologic appearances of the gastric mucosa were those found at the height of digestion.

A. Stengel⁴ discusses the class of patients that have sensations which they interpret as being due to the **presence of living animals in the stomach**. He reports several such cases that he has seen, and refers to others described in literature. He believes that these sensations are usually **due to some anatomic peculiarity**; in support of this view he mentions one case in which there were polypoid projections from the mucosa, which might readily have caused the sensation of living and moving things. He believes that these patients should not be considered to be merely the subjects of delusions, but that an attempt should be made to relieve them by proper diagnosis and treatment.

¹ Amer. Med., Jan. 10, 1903.

² Med. Rec., Sept. 6, 1902

³ Arch. per le scienze med., 1902, xxvi, Fasc. 3.

⁴ Univ. of Pa. Med. Bull., May, 1903.

M. Einhorn¹ gives a further discussion of the histology of the **gastric mucosa in pathologic conditions of the stomach**. He tabulates 34 cases in which studies of small pieces of gastric mucosa were made. The conditions found are discussed, and the author concludes that secretory functional disturbances of the stomach are not based upon a primary change in the mucous membrane. If lesions of the mucous membrane occur, they are apparently secondary. In especially favorable circumstances carcinoma of the stomach may be diagnosticated from pieces of gastric mucosa, if it can be shown that there has been a direct invasion of the gland-substance by epithelial cells. The author believes that in secondary anomalies therapeutic measures should be directed toward the general condition, and only secondarily toward the local disorder.

Weidenbaum² reports his examination of 2 cases of achylia gastrica in which ferments were absent, but in which administering half a liter of decinormal HCl and removing the stomach-contents after 20 minutes showed the presence of both pepsin and milk-curdling ferment. The use of a test-breakfast directly after this also showed the presence of pepsin and milk-curdling ferment. This result indicates that in certain pathologic circumstances **the proferments may be present when the ferments themselves are absent**; and it is possible that in many cases of achylia gastrica the apparent absence of the ferments is due merely to the absence of HCl. It is noteworthy that the HCl caused marked discomfort in these patients, and the stomach-contents afterward showed the presence of mucus and bile; hence, the acid had evidently disturbed the motility of the stomach.

G. W. McCaskey³ reports some experimental observations concerning the **electric reactions of the gastrointestinal musculature** and their therapeutic value. He believes that electricity may produce valuable results, faradism being the preferable form. The mucous lining of the digestive tract offers no special obstacle to the passing of the current; and currents, when applied either percutaneously or with the electrodes within the digestive tract, pass directly through the abdominal wall and the walls of the viscera beneath. The author found it impossible to produce a physiologic peristaltic wave of the stomach by electric stimulation, but the electric current produced an increase in the tonicity of the stomach-wall with decrease in volume. Faradization of the colon produced active intestinal peristalsis.

H. Holsti⁴ discusses the **influence of morphin upon the secretion of the gastric juice**. He decides that it apparently **first decreases the secretion, and subsequently causes an increase**. It is probable that morphin in small doses acts as an excitant to the gastric juice, and that in large doses it reduces the flow. Its action varies greatly, even in the same person. The author also made some studies of the effect of the drug upon the conditions in the empty stomach, and obtained similar results. He believes that the effect of morphin upon the

¹ Am. Jour. Med. Sci., Oct., 1902.

² Med. Rec., July 26, 1902.

³ Therap. d. Gegenwart, 1902, No. 7.

⁴ Zeit. f. klin. Med., Bd. xlix, Hefte 1-4.

stomach is due chiefly to its disturbing the motility, rather than to any direct effect upon the secretion of the gastric juice.

A. W. Perry¹ recommends the administration of hydrochloric acid, for gastric disease, in combination with beef. He states that in this way very large quantities of hydrochloric acid may be administered without causing any symptoms of irritation.

J. Friedenwald² reports 2 cases in which a portion of a **stomach-tube was swallowed** and was removed by gastrotomy. In both cases the swallowing of a portion of the tube was due to the fact that an old, worn-out stomach-tube was employed, in one case by the patient, and in the other by an "herb doctor." The author considers it essential to watch over the condition of the tube, when the patient is allowed to use it on himself.

A. Meinel³ reports the interesting observation that in a case of hyperacidity in beginning tabes he found that the stomach-contents were of a rosy red color, and gave the **characteristic spectrum for urobilin** and a marked zinc chlorid-ammonia reaction. There was no reaction for bile. A similar observation, which also was apparently due to the presence of urobilin, was reported by Penzoldt. The conditions for the production of urobilin in the stomach seem to be marked HCl acidity, the presence of fresh bile in the stomach, and the prolonged retention of this bile in the organ. These conditions were imitated in the test-tube, and it was found possible to produce urobilin through the action of marked HCl acidity, in the absence of all gastric ferments and in the absence of any bacterial influence. It is, therefore, apparently possible for urobilin to be produced in the digestive tract in the absence of the factors mentioned, and also in the absence of nascent hydrogen. It probably, however, occurs somewhat rarely, and only in pathologic circumstances. [This observation has some interest in relation to the intestinal origin of urobilinuria and the supposed constant activity of intestinal bacteria in causing the condition.]

F. Treves⁴ discusses the **mimicry of gastric troubles by spinal disease**, first referring to the case of a woman of 45 years who had such severe and distressing gastric pain, with vomiting and dilation of the stomach, that an operation was seriously considered. It was, however, noted that the patient was extremely hypochondriacal, and examination of the back showed Pott's disease. The gastric symptoms and the dilation disappeared after confinement in bed in the recumbent posture. In another patient there was a complaint of persistent intense pain in the region of the stomach and increasing weakness. The pain followed immediately upon eating, the symptoms being entirely gastric and the stomach being considerably dilated. The patient was losing ground so rapidly that operation was undertaken, and it was found that the dilation of the stomach disappeared under anesthesia. Exploratory abdominal section showed nothing. Some time afterward it was found that there was a lump between the patient's shoulders. This proved to be a sar-

¹ Pacific Med. Jour., May, 1903.

² Zent. f. innere Med., March 28, 1903.

³ Amer. Med., Aug. 2, 1902.

⁴ Practitioner, Jan., 1903.

coma growing from the mid-dorsal region of the spine. The author insists that **when pain is the predominating symptom** in what appears to be gastric disease, **one should be doubtful** about the correctness of the diagnosis of gastric disorder.

GASTRITIS.

F. B. Turck¹ reports some results from the **experimental production of gastritis** by the introduction of an emulsion of mustard. This rapidly produced an exudate composed of cells, granular debris, fibrillar masses, leukocytes, and red cells, the debris later becoming homogeneous. There was evidently a marked chemotactic effect. The destructive changes in the epithelium were particularly marked in the deeper portions. The parietal cells early showed necrosis, and karyokinetic figures appeared within 6 hours. After a short time microorganisms began to grow in abundance.

S. Mintz² discusses **hemorrhagic erosions** of the stomach, reporting 2 cases. He believes that the name is a bad one, and that the condition should be termed chronic exfoliative gastritis or chronic ulcerative gastritis; for he does not believe that it constitutes a definite disease, but only a special variety of gastritis. Both patients recovered rapidly after using silver-nitrate lavage.

PYLORIC STENOSIS.

W. P. Obrastzow³ discusses **palpation of the pylorus**. He refers to his previous mention of the possibility of palpating the pylorus, and states that he considers the palpability of the pylorus to be, as a rule, of little importance. In a study of its frequency in 900 cases, he found it present in only 9 instances; but he believes it to be more frequent than this. He describes these cases in detail, and refers especially to the fact that the pyloric antrum also may become palpable. The characteristic that stamps the palpable mass as the pylorus or the pyloric antrum is the intensity of the peristaltic movement. The mass may be felt for some seconds as a firm, cylinder-like mass; it then relaxes, and afterward disappears. Several seconds are occupied in the contraction and disappearance. One can also often feel a small nodule, about the size of a hazelnut, instead of the firm cylinder. The author particularly directs attention, also, to the crepitus that one feels and hears, which he considers to be of a peculiar quality. The distinction of pyloric spasm from carcinoma or other tumors is sometimes important; but the peristaltic contractions and relaxations are, as a rule, quite characteristic. The mass is determined not to be the colon if it lies considerably above the lower border of the stomach. Obrastzow notes one case in which a **palpable and even visible tumor** was present from time to time in the region of the pylorus, in a student 21 years old. This he believes he determined

¹ N. Y. Med. Jour., Oct. 25, 1902. ² Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

³ Deut. med. Woch., Oct. 23, 1902.

to be a palpable pylorus and pyloric antrum. Acid and ferments were absent in this case, and there was decomposition of food in the stomach. He thinks that the appearances at the pylorus were **pathologic spastic contractions**. The spasm seemed to involve the whole stomach in this case, however. The author thinks that there was a motor neurosis of the stomach in this patient. [This spasm of the pylorus and pyloric antrum is not by any means a clinical curiosity, and unless it is kept in mind serious diagnostic errors are likely to be made.]

E. Villard¹ reports a case of **pyloric stenosis of biliary origin**. Laparotomy was carried out, and the stenosis was found to be due to adhesions and compression. The adhesions were between the pylorus and the duodenum, on the one hand, and the gallbladder, on the other. They had elevated these organs abnormally and caused a sudden closure of the common duct. The duct also contained 2 stones, which had caused compression of the duodenum. There had been a markedly paroxysmal character to the symptoms, which had evidently been due to variations in the degree of stenosis, dependent upon chemical conditions.

R. Kaufmann² demonstrated to the Vienna Medical Society a case in which a **perigastric tumor** as large as a child's fist had disappeared after repeated subcutaneous injections of thiosinamin. In the discussion, Teleky said that in several cases he had successfully treated strictures of the esophagus by the same means.

GASTRIC DILATION.

T. C. Allbutt,³ in opening a discussion on the causes, diagnosis, and treatment of dilation of the stomach, first refers to a condition that he prefers to term **extension of the stomach**, by which he means the condition in which there is a moderate increase in the size of the organ with symptoms due to this, but not of the pronounced type found in decided dilation. He believes that emaciation is an important **element in the production of gastrophtosis**, as he has seen the stomach sink and rise again in association with emaciation and subsequent improvement in nutrition. He does not think that gastrophtosis produces discomfort in neurotic persons only. He has seen the stomach enlarge during prolonged attacks of violent intercostal neuralgia, the normal limit being regained between the attacks; but the attacks apparently had no dependence upon gastric disorder. While he decries the ready acceptance of a nervous etiology in gastric conditions, he believes that under nervous perturbation a sort of paresis of the stomach may occur. He refers to cases of this kind due to mental or physical shock. He mentions **athletic overexertion as a cause** of relaxation of the stomach. He believes extension of the stomach to be extremely **common after acute disease**, and that it leads to definite symptoms of imperfect convalescence or permanent ill health. He insists upon the importance of recognizing these milder cases of enlargement of the stomach. It is common, also,

¹ Gaz. hebdom. de Méd. et de Chir., No. 45, 1902.

² Zeit. f. innere Med., Jan. 3, 1903, p. 30.

³ Brit. Med. Jour., Nov. 1, 1902.

in disease of the heart, and has to do with causing many of the symptoms of cardiac disease in some cases. In discussing the **diagnosis**, Allbutt states that he has not obtained much aid from auscultatory percussion, nor from coin-tapping. He refers to the difficulty, in carrying out the splashing-sound test, that there is in distinguishing the colon from the stomach. This difficulty can usually be overcome by repeated examinations at various hours, by careful history-taking, by inspection of the excreta, etc. The author refers to the importance of observing the presence of seeds, grit, or fiber in the vomit and stools, particularly if it can be determined when these substances were swallowed. They may make it possible, for instance, to decide that there is no obstruction of the bowels in cases of peritonitis. He finds that, with healthy stomachs, soon after meals there is no stomach resonance. If resonance is present, the conditions are abnormal. In his remarks upon **treatment**, he notes that he has found all forms of electricity disappointing; while the administration of water per rectum is not usually necessary, except in obstructive dilation, although in heart-disease he has occasionally found it useful. When vertigo or fluttering of the heart accompanies relaxation of the stomach, the avoidance of liquids at meals has often served to overcome these symptoms. W. H. Broadbent agreed with Allbutt concerning the frequency of enlargement of the stomach after acute disease. He also agreed with him that women sometimes starve themselves into dilation. He referred to a case in which severe sweating had occurred for 2 years; dilation of the stomach was discovered, and treatment directed to this relieved the sweating within a fortnight. J. Haddon also mentioned a case in which **persistent sweating** was a **symptom of dilated stomach**. The sweating improved with treatment, and again grew worse when the diet was overstepped.

J. W. Russell¹ reports a case of **multiple neuritis** in a woman of 21 years who developed very **marked dilation of the duodenum**. The cause of the multiple neuritis was not determinable. There was apparently no source of lead-poisoning, and she was not alcoholic. The onset of the multiple neuritis had been very gradual. The general examination of the trunk was noted as negative when the multiple neuritis was first recognized, but the condition of the stomach was not specifically mentioned at this time. Later, it was found that the stomach was dilated; and this condition increased, with persistent vomiting. Ultimately the patient died. The dilation of the duodenum was so enormous that it was at first thought that it was a dilated stomach. The stomach itself was dilated, but not extremely. The duodenum was separated from the stomach by a well-marked sulcus at the pylorus. It was adherent to the gallbladder by chronic adhesions. The only possible source of pressure upon the duodenum was that from the superior mesenteric vessels. The case is thought to throw some light upon the cases of **acute dilation of the stomach and duodenum**. It is of especial interest in relation to the theory of paralytic dilation followed by obstruction from kinking

¹ Birmingham Med. Rev., Nov., 1902.

of the stomach and pressure upon the duodenum. In this case some of the fibers of the vagus showed degeneration.

H. C. Thomson¹ reports a case of acute dilation of the stomach in which there was an extremely marked acute dilation of the upper 8 feet of the intestine. This case, in connection with others that the author has reported, disposes, he believes, of the view that the dilation is due to **constriction produced by the superior mesenteric artery.**

Complications.—W. E. C. Dickson² contributes an interesting report of a case of **gastric dilation with tetany**, in which recovery occurred; and also a discussion of this condition. The patient was a man of 47 that exhibited dilation of the stomach and had had several severe gastric attacks previously to his admission, but no tetanoid symptoms. He came into the hospital on October 3; and on the first of November, after severe vomiting, showed the first symptoms of tetany. He went into a very grave condition; repeated attacks of tetanoid spasm occurred, often after vomiting; and his general condition was, for a long time, extremely unfavorable. After over a fortnight of very grave illness he began slowly to recover. It was noted that during the attacks there seemed to be a **spasmodic contraction of the vessel-walls**, such as has been seen in other cases. Erythrol tetranitrate was administered in small doses with apparent benefit. Respiration was not notably affected during the attack. The amount of urine was small before the onset of the attack of tetany, and increased after this. During the period of his improvement and recovery, it was much freer in amount. A trace of albumin was found during the early part of the attack. Bile was also noted in small amount in the urine. A **very marked leukocytosis** was found during the attack, but disappeared afterward. The leukocytes had not been counted previously to the onset of the attack. The patient's stools were exceedingly offensive, and there was much distention of the intestines with flatus. During the course of the attack the stomach was extremely over-distended, reaching nearly to the symphysis, while it rapidly contracted after the tetanoid symptoms had disappeared. It was noted that during the attacks there was alternate involvement of the flexor and extensor muscles of the forearm, and that the left arm was much more affected than the right. The man was **temporarily blind**; this probably indicated some involvement of the optic nerves. The pupils were at first dilated, and afterward semicontracted; some authors describe one condition as typical, and others mention the contrary condition as characteristic. This case is thought to have been the most severe case of gastric tetany that has ever been reported as having recovered. The success in the treatment of the case was apparently dependent upon **persistent lavage and evacuation of the putrefying contents** of the stomach. Lavage should be carried out very frequently; if necessary, several times a day. The author states that, after washing the stomach with a solution of phosphate of soda, the introduction of a considerable amount of boiled milk containing sodium phosphate in the proportion of a dram to half a pint, diluted somewhat with hot water, will often

¹ Lancet, Aug. 2, 1902.

² Practitioner, Jan., 1903.

greatly relieve the gastric pain and irritability. This patient was also much relieved by **saline hypodermoclysis**. The filtrate of the stomach-contents, as well as extracts made with saline solution and with alcohol, after evaporating and drying in vacuo, was injected into animals with negative results. Cultures obtained from the stomach-contents, consisting chiefly of *Bacillus coli*, produced no results when injected into animals. The patient whose case is reported afterward had a return of severe gastric symptoms and was operated upon, adhesions being found near the pylorus and on the posterior surface. Gastrojejunostomy was carried out and the patient was entirely relieved of his symptoms.

Treatment.—A. W. Perry¹ discusses the **use of carbonated waters at meals**, and the influence of such waters upon digestion. He found that the rapidity with which potassium iodid could be recognized in the sputum after taking it into the stomach was increased by the use of carbonated water; the amount of urine was also increased when the water taken was carbonated. The author believes that the latter point indicates that the stomach empties itself rapidly, since absorption takes place chiefly from the intestine. These results agree with those previously reported and, he believes, indicate that carbonated waters are beneficial in conditions in which one wishes to have the stomach empty itself promptly.

A. Crombie and T. J. Bokenham² report a series of 17 cases of non-obstructive dilation of the stomach treated by means of **high frequency electric currents**. They report results that appear to be remarkable.

GASTROPTOSIS.

J. D. Steele and A. P. Francine³ report an analysis of 70 cases of gastrophtosis and give extensive references to the literature of the subject. They consider it much more common than textbooks indicate. There has, as yet, been no explanation given that will apply satisfactorily to all classes of cases. The authors usually found the stomach in vertical or subvertical position; total descent was not observed. Some dilation was always present. The **transverse colon invariably shared in the displacement**. The right kidney was movable in 60.9 % of the cases; the left kidney was rarely movable. The spleen was movable in one case. The authors believe that the **liver is quite frequently movable** and sags downward. No condition of the gastric contents is peculiar to gastrophtosis, but free HCl is, as a rule, diminished or absent. There were no characteristic blood or urinary changes. The subjective symptoms were those of gastric motor insufficiency; they were of mild grade, except when dilation was present. Pain in the upper abdominal region was noted in about half the cases; in the lumbar region, in one-fourth. The same causes that produce neurasthenia are believed by the authors to be active in the production of ptosis of the abdominal organs.

E. S. Fogg⁴ reports a case of gastrophtosis with gastrectasis, in which

¹ Pacific Med. Jour., Aug., 1902.

² Lancet, Oct. 18, 1902.

³ Jour. Am. Med. Assoc., Nov. 8, 1902.

⁴ Amer. Med., March 28, 1903.

Beyea performed his operation of **elevation of the stomach**. The patient's health markedly improved within a few weeks after this operation, and she gained 10 pounds. She is now considered to be in good health. It is of interest to note that the patient was very deaf at the time of the operation, but that her deafness gradually disappeared after her stomach had been elevated. She also had **excessive nocturnal urination** before the operation, which disappeared afterward. This is believed to be due to the better emptying of the stomach when she assumed the recumbent posture, and the consequent freer absorption of fluid.

GASTRIC ULCER.

Etiology.—A. Cross¹ has made an experimental study of **trauma in the causation** of gastric ulcer, allowing objects to fall upon the abdomens of rabbits in the first series, and in the second series striking blows upon their abdomens. The result was to produce internal hemorrhages in various regions, and in some cases hematoma of the stomach. His conclusion is, however, that trauma of the abdomen may cause injury of the stomach, which may for a time produce the symptoms of gastric ulcer, but which soon heals. Some other factor is essential in order to produce chronic gastric ulcer.

R. Dallavedova² contributes a long paper concerning the pathogenesis of gastric ulcer, with the report of a series of experiments. He concludes that **lesions of the abdominal sympathetic** produce necrotic and ulcerative changes in the wall of the stomach; and he believes that he has demonstrated that damaging the celiac plexus or the splanchnic causes in dogs necrotic, hemorrhagic, and ulcerative changes that exhibit the necrobiotic characteristics of gastric ulcer in man. In every way possible he avoided the influence of cold, of chemicals (antiseptics), and of rough handling. He also carefully avoided sepsis.

W. Backman³ has made a study of the **frequency of gastric ulcer in Finland**, and contributes some remarks concerning its etiology. These remarks are chiefly negative. He finds that the disease is not rare in Finland, and that it is about as common in the different regions of that country as it is in the various parts of Germany, for instance. Both sexes apparently suffer about equally, when the dilations, etc., resulting from the ulcer are considered, as well as the active symptoms of ulcer. The author could not find that maid-servants are especially predisposed to it. It occurs about equally in all classes. The condition of the general health does not seem to be important in the causation of the condition. In 21 of 207 cases, trauma had preceded the development of the ulcer, but it is doubtful whether this trauma had any direct relation to the production of the ulcer. It could not be satisfactorily determined that alcoholism has any important effect.

¹ Mitth. a. d. Grenzgeb. d. Med. u. Chir., Bd. x, Heft 5.

² Arch. f. Verdauungskrankh., Bd. viii, Hefte 1-5.

³ Zeit. f. klin. Med., Bd. xl ix, Hefte 1-4.

F. H. Murdoch¹ discusses the use of **orthoform** in the diagnosis of gastric ulcer. This substance is said to relieve the pain of gastric ulcer greatly, and the author considers that relief of the pain by orthoform indicates the presence of gastric ulcer.

Complications.—A. P. C. Ashurst² reports an interesting case of gastric ulcer in a woman of 75, in which there were no striking symptoms except marked discomfort from what the patient called wind in her stomach. Her temperature was 98.5° F.; her pulse, 60; her respirations, 30. She had some sharp pain shortly before her death, but complained little of it. She was found dead during the night. Autopsy showed over 2 quarts of foul pus in the peritoneal cavity. The stomach showed a **perforated ulcer opening into a ruptured abscess-cavity**, which was beneath the left lobe of the liver. On the posterior surface of the stomach there was a second perforated ulcer, separated by the lesser omentum from that first described. The **latency of the symptoms was very striking**. The author insists upon the fact that absence of changes in the pulse and temperature may not uncommonly be observed in peritonitis. He mentions another fatal case of peritonitis from appendicitis, recently seen, in which the inflammation had probably lasted a week. The temperature was normal and the pulse was below 88. A further case is referred to, in which, with fracture of the skull, there was a rupture of the stomach with diffuse peritonitis; and yet the pulse did not rise above 90, and the temperature remained below 99.5°.

Elsner³ demonstrated to the Berlin Medical Society a case of **cured gastrocolic fistula**. The fistula had developed in the course of gastric ulcer, and characteristic symptoms had been present for 3 years before the patient was exhibited. He had had signs of ulcer 19 years previously, but had apparently recovered, and had remained well until the time of the development of the fistula. He was operated upon, and was apparently entirely cured. Only one similar case could be found in literature.

Albu⁴ describes a case of **benign adenoma** of the stomach arising upon the basis of a peptic ulcer—a case that he considers unique. Such tumors are, at best, rare, even when unassociated with ulcer. In this case, that of a man of 50, there was a history of gastric ulcer. Later, the man exhibited marked anemia and emaciation. There was a mass as large as an apple, palpable in the region of the pylorus; and the stomach was much dilated. This mass was extirpated, and proved to have no microscopic appearance of malignancy. In the middle of the mass there was a deep oval ulcer.

G. Rosenfeld⁵ discusses the **diagnosis of hour-glass contraction** of the stomach and the various suggestions for reaching this diagnosis that have been made. In the case that he reports he introduced a stomach-tube containing a metal spiral, and observed the position of its lower end with the fluoroscope after inflating the stomach. He found

¹ N. Y. Med. Jour., Nov. 20, 1902.

² Am. Jour. Med. Sci., Oct., 1902.

³ Zent. f. innere Med., 1903, p. 383.

⁴ Deut. med. Woch., Nov. 27, 1902.

⁵ Zent. f. innere Med., Feb. 14, 1903.

that below the point to which the tube could be passed there was a bright cavity filled with air, and that at the lower border of this there was the collection of stomach-contents that can usually be observed in the lowest part of the stomach. In other words, the stomach apparently reached 8 cm. below the lower border of the sound. This, he believes, could be attributed only to hour-glass contraction; and the fact that the patient complained of colicky pains associated with splashing and squirming noises indicated the same thing. The post-mortem examination confirmed the diagnosis. It had been determined during life that the connection between the two parts of the stomach was fairly large, because it had been possible to pass a soft stomach-tube into the lower cavity.

Treatment.—K. Walko¹ reports his results from the **treatment of gastric ulcer with olive oil.** He uses the oil because it tends to reduce the secretion of acid, to protect the ulcer, and to keep the bowels regular. At the same time, it is a useful food. He gives a dessertspoonful at first, and afterward as much as 50 cc., 3 times a day. If the oil causes nausea, he administers from 100 cc. to 200 cc. through the stomach-tube, for from 3 to 6 days, after which most of the symptoms are generally much reduced in intensity. He reports a number of cases in which good results were obtained.

H. Elsner² refers to the use of **bismutose** in the treatment of hyper-acidity and of gastric ulcer. This substance, which is a combination of bismuth and albumin, has been recommended because it has a higher acid-combining power than has bismuth alone, because it is more insoluble, and because it has a more astringent action. On account of its being more insoluble, it is also less likely to produce toxic symptoms when used in large doses. The author has found that in cases of hyper-acidity, if a simple test-meal is given and the results are compared with those obtained when a test-meal is given together with bismutose, much lower values for HCl are discovered in the second instance. He has had excellent results in treating hyperacidity and gastric ulcer. Bismutose, unfortunately, however, has very active astringent effects and is likely to produce marked constipation.

G. Fuchs,³ in discussing the action of bismuth from a chemical standpoint, reaches the conclusion that calcium carbonate, magnesia, and similar chemicals are not good substitutes for bismuth in gastric ulcer; for the **bismuth does not act simply mechanically and as an antacid.** Its action is, the author believes, due to the reduction of the subnitrate to oxyhydrate, the latter being dissolved, passing into the granulating tissue, and having a specific effect there; and also causing the production of a free secretion of mucus, with which it becomes mixed and acts as an admirable protective. Bismutose, because of its readily undergoing reduction, is peculiarly suited to medical purposes.

¹ Zent. f. innere Med., Nov. 8, 1902.

² Arch. f. Verdauungsrankh., Bd. viii, Heft 6.

³ Deut. med. Woch., April 2, 1903.

GASTRIC SYPHILIS.

Dieulafoy¹ reports a case of syphilis of the stomach with profuse hematemesis. The man had had syphilis in 1884, and had had numerous tertiary symptoms. The severe hematemesis was not explainable on the ground of carcinoma or of peptic ulcer. Syphilitic treatment was used and was rapidly successful.

AMYLOID DEGENERATION.

F. Steinhaus² reports a somewhat unique case in which the clinical symptoms were those of a **malignant tumor of the pylorus**. Necropsy showed deposits of amyloid and hyaline material in the epicardium and endocardium and in the stomach and intestine, the deposits being in the form of very **numerous disseminated small tubercles**, the appearance resembling that of miliary tuberculosis. The stomach was dilated, its wall thickened, and the pylorus contracted.

GASTRIC CARCINOMA.

A. Gluzinski³ describes a new method for the **early diagnosis of carcinoma of the stomach** in those cases in which HCl is present and in which the symptoms resemble those of ulcer. He examines the stomach-contents 3 times on the same day: first, when fasting; secondly, after a test-meal, consisting of egg-albumen; and thirdly, after a test-dinner, including a portion of beefsteak. He states that in cases of simple ulcer free HCl will always be found present; in cases of carcinoma, on the contrary, free HCl will usually be absent after one or more of the test-meals. If the latter is the case, it speaks for carcinoma. The author reports 4 cases in which this method indicated carcinoma, operation was undertaken, and very small tumors were found. In one case the tumor was the size of a walnut; and in another, the size of a hazelnut. In one of the cases no macroscopic tumor was found, but the microscope showed the presence of carcinoma. This patient, and the other with an extremely small tumor, died soon afterward of metastases. The author does not think that the outlook for operation in carcinoma of the stomach is very satisfactory.

K. Glaessner,⁴ after a series of observations of patients, reaches the conclusion that if the milk-curdling ferment and the pepsin in the stomach-contents are equally decreased in a case of carcinoma, it **indicates a fundus growth**; but that if the milk-curdling ferment is present and the pepsin is relatively much reduced, it indicates a pyloric growth.

N. B. Gwyn⁵ reports a case of gastric carcinoma associated with a very striking and persistent hyperchlorhydria, in which there were **curious attacks of intense stupor** on 4 occasions within 6 months. There was no evidence of morphinism in the case; the symptoms had

¹ Jour. de Méd., 1902, No. 23.

² Zeit. f. klin. Med., Bd. xiv, Hefte 5 u. 6.

³ Mitt. a. d. Grenzgeb. d. Med. u. d. Chir., Bd. x, Hefte 1 u. 2.

⁴ Berl. klin. Woch., July 21, 1902.

⁵ Phila. Med. Jour., May 16, 1903.

no resemblance to those of uremia; and no evidence of acid intoxication could be found.

Westenhoeffer¹ demonstrated to the Berlin Medical Society the preparations from a case of colloid carcinoma of the stomach. The carcinoma had grown through the abdominal wall **in the track of an old operation-wound**. The case was interesting because of the fact that the man was admitted with gastric symptoms and had a scar of an old wound, which was thought to be that of a gastroenterostomy. In the gastric region there was a tumor with a fistula, through which came gas and fluid. In order to determine whether the fistula led into the stomach or into the intestine, pepsin and trypsin were looked for; but only the latter was present.

P. Koch² reports 2 cases of **carcinomatous gastrocolic fistula**. The first occurred in a man of 36, admitted with a history of feculent vomiting, whose vomit was found to be identical with the bowel movement, and in whom lavage with methylene-blue water caused the stool passed immediately afterward to be stained blue. Death occurred the same evening, and postmortem examination showed a gastrocolic fistula due to carcinoma. In the second case, that of a man of 68, the signs of gastrocolic fistula were developed in the clinic. On June 22 the man vomited some bright blood. On the 23d, he vomited feculent material. The feculent vomiting continued, and even enemas were vomited. Postmortem examination revealed the diagnosis in this case also. In a **general study of the literature** of this condition, it is noted that the symptoms present are often such as to make it impossible to establish a diagnosis. In a large proportion of cases no typical symptoms are exhibited; and very frequently the course of the carcinoma, which is the usual cause of the condition, is almost or wholly latent. The main characteristics of the condition are fecal vomiting; lienteric diarrhea, which the author believes to be more common in these cases than is usually thought, if it is properly looked for; and the identical appearance of the vomit and the stool. Accessory symptoms are rapid emaciation, great thirst, feculent breath, and feculent eructation; also sudden cessation of persistent vomiting; the discovery of HCl in the stools; the passage per rectum of air insufflated into the stomach, or, per contra, the passage into the stomach of air insufflated per rectum; and the appearance in the vomit of colored substances introduced per rectum, or, on the contrary, the passage per rectum of colored substances introduced into the stomach. The condition is likely to be mistaken for intestinal occlusion or for acute peritonitis, and sometimes for hysteria. A collection of cases, taken chiefly from Bee, follows.

G. Kelling³ reports a case of **gastrocolic fistula in a man only 27 years of age**. The condition was due to carcinoma. The chief symptom was feculent vomiting, which became worse when he had diarrhea, and was much less marked when he was constipated. The

¹ Zent. f. innere Med., April 4, 1903, p. 360.

² Arch. f. Verdauungskrankh., Bd. ix, Heft 1.

³ Arch. f. Verdauungskrankh., Bd. ix, Heft 1.

fistula was successfully treated by operation. The case is remarkable for the fact that subsequently the old symptoms returned; and it was found at postmortem that **two spontaneous gastroenterostomies** had established themselves, the connections being with the small intestine and of the type produced in Hacker's operation.

GASTRIC SARCOMA.

J. Petrokonski¹ reports a case of primary sarcoma of the stomach, and gives a general discussion of the pathology and diagnosis of the condition. The case occurred in a man of 34, whose active symptoms had begun 4 or 5 years previous to his death, and had increased gradually, until there were severe gastric disturbances, consisting chiefly in pain, loss of appetite, and vomiting. The patient himself had noticed a mass in the hypogastrium, and physical examination showed a mass involving the whole region of the stomach, without evidences of metastasis. The rather curious statement is made that the stomach-contents after a test-meal showed much lactic acid with distinct amounts of free HCl, and numerous bacilli with occasional sarcinæ. The red cells were reduced to 1,500,000; the white cells were 18,000; and the hemoglobin, 24 %. The necropsy showed a marked dilation of the stomach with a diffuse thickening of the wall, the tumor **involving two-thirds of the organ.** The wall of the stomach was 3 cm. thick in places. Microscopically the tumor proved to be a sarcoma, chiefly of the round-cell variety, with, however, a considerable number of spindle-cells. The **diagnosis of sarcoma of the stomach** may be made with considerable probability if the patient develops a mass of progressive growth, connected with the stomach, that exhibits a very prolonged clinical course. These cases often last for 3 or 4 years, while carcinoma usually causes death much sooner. It is also interesting that the patients with sarcoma have repeatedly been shown to retain HCl in the gastric contents at a period when it would, in most instances, have been long absent in carcinoma. Besides, the **vomiting of blood is much less common** in sarcoma than in carcinoma. Enlargement of the spleen has been said to be important in the diagnosis, favoring sarcoma; the literature, however, gives no justification for this statement, as splenic enlargement is not uncommon in carcinoma.

DISEASES OF THE INTESTINES.

GENERAL CONSIDERATIONS.

Schottelius² discusses the **importance of the intestinal bacteria in nutrition.** He believes that the organism becomes so habituated to the presence of these bacteria that they are essential to proper nutrition. He reports some experiments of his own, in which the condition

¹ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

² Zeit. f. diätet. u. physikal. Therap., Bd. vi, Heft 3.

tions in chickens fed normally were compared with those in chickens that were aseptically removed from the eggs in which they hatched, that were given sterile food, and that were themselves kept sterile. In a certain period, the normal chickens gained over 100 % of their original weight; while the **sterile chickens showed a constant loss of weight**, which was as great as 32 % of their original weight. Most of them died within a fortnight; and their sterility was shown by the fact that when they were kept in gelatin no cultures developed.

J. Strasburger¹ discusses the literature concerning the **numbers of bacteria in human feces** and criticizes all the methods previously used for determining their number, considering that these give too small results. He then describes his own method, which consists in measuring off 2 cc. of feces, rubbing this well with water, and centrifugating. He has found that the bacteria stay suspended in the water, while the grosser particles fall to the bottom. He then adds a large percentage of alcohol and centrifugates again. This time the bacteria go to the bottom. He now determines the weight of the bacterial residue and compares it with that of the total fecal residue. He has studied a series of normal cases and cases of patients suffering from various disorders, reaching the following conclusions: In such studies it is important, in the beginning, to have the patient upon a test diet; and the feces of each day should be well marked off. The author uses for this 0.2 gm. of carmine. Normally, about **one-third of the dry residue of the feces** in adults consists of the remains of bacteria. The average amount by weight, normally, is 8 gm.; with dyspeptic intestinal disturbances, about 15 gm., but it may reach 20 gm.; with constipation, 5.5 gm., or even as little as 2.6 gm. The low amounts in constipation indicate that the food is abnormally well absorbed in this condition and that the bacteria have little nourishment. The author considers it probable that poor development of the bacteria is an important factor in the actual production of constipation, and that diagnostic and therapeutic conclusions may perhaps be reached from such studies of constipation. In one case of acholia he found the amount of bacteria very low; as the obstruction was overcome, the amount again increased to normal [a curious result, considering that putrefactive processes usually seem extremely active in acholia]. Sucklings have about the same percentage of bacteria as adults; dyspepsia, however, may increase the amount in them to two-thirds of the feces. The average daily excretion of bacteria the author considers to be, normally, about 120,000,000,000. At least half of the total nitrogen of the feces he considers to be referable to bacteria. He believes that by studying the number of bacteria in the intestines, the **actual effect of so-called intestinal antiseptics may be determined.**

L. H. Hofbauer² claims that he has shown that **fat stained with alkanna red is absorbed without digestion** and may be found still stained in the lymphatics. Pflüger's criticism that the fat might have been digested and the dye absorbed as such, after which it stained other

¹ Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

² Zeit. f. klin. Med., Bd. xlvii, Hefte 5 u. 6.

fat, is not supported by the facts; for alkanna red becomes blue and insoluble in an alkaline medium, and the dye itself is made but slightly more soluble by the presence of bile, glycerin, and soaps. The author believes that his work has demonstrated that fat, as well as a substance foreign to the organism (alkanna red), may be absorbed without digestion. [It seems probable that this is true, in spite of Pflüger's contention; but it seems equally probable that it is not a fact of great importance in relation to the absorption of food, for most of the fat is almost certainly split before absorption.]

A. Albu,¹ in some contributions concerning intestinal putrefaction, reports his observations upon the **ethereal sulfates and the indican in the urine of a vegetarian.** This patient was investigated because the diet had consisted solely of vegetables and fruits. The ethereal sulfates averaged less than 0.075 gram. In spite of this, the indican reaction was at times very marked. The author believes, therefore, that the **indican test is of little importance** in ordinary clinical work, and may be misleading as well as helpful. In his further observations, he investigated the effect of putting a patient on an almost exclusively vegetable diet, entirely excluding animal albumin. He found that the ethereal sulfates on this diet varied from 0.077 to 0.252 gram. He decides, therefore, that there is no evidence that the use of vegetable albumin reduces intestinal putrefaction. [Whatever the results obtained by Albu, there is no question that intestinal putrefactive processes are at times reduced by replacing much of the meat by vegetables.]

DIARRHEA.

A. C. Jordan² reports some experimental work on the **effect of certain organic acids** upon the intestines, with especial relation to the causation and treatment of diarrhea. He describes in detail his method of introducing these substances directly into the intestine and then noting the changes, gross and microscopic, that ensue. He has studied, more especially, acetic, tartaric, lactic, racemic, and butyric acids; sour milk, buttermilk, and cream; and also hydrochloric acid and gastric juice. The **most striking results were obtained with butyric acid**, which had a markedly irritating action in proportion to its concentration. It was necessary to use a concentration of more than 0.3 % of butyric acid in order to cause definite injury to the rabbit's small intestine within half an hour. The author refers to the statement of Brunton that uric acid is the cause of heartburn, and to the general toxic effects that butyric acid has been found to produce. He states, however, that he has found butyric acid to have a markedly bactericidal effect upon cultures of streptococcus, staphylococcus, coli communis, and typhoid bacillus, when the butyric acid was present in the proportion of 0.1 %. He believes that in certain disorders of digestion, particularly certain diarrheas, butyric acid is likely to be formed from milk and

¹ Berl. klin. Woch., Nov. 24, 1902, and Feb. 16, 1903.

² Practitioner, Sept., 1902.

glucose in large amounts; hence, that milk and carbohydrates are not suitable articles of diet in such cases. [This somewhat theoretical conclusion is perhaps applicable to a limited number of cases, but it cannot offset the fact that milk, properly prepared, is very often the most suitable diet for such cases.]

E. H. Young¹ reports a case of **grave and persistent sprue** in a woman who had lived in India, but had left there 10 years before the attack described began. The symptoms were almost uncontrollable, but gave way somewhat to a milk-diet. This diet, however, always caused a dangerous loss of weight and strength. The symptoms finally **disappeared with striking rapidity**, after the patient had been allowed to eat strawberries freely. An interesting feature of the case was the occurrence of **attacks of tetany**. It was also noted that the pulse became peculiarly hard and intermittent just before the passage of large, fermented bowel-movements. It was always possible to predict an increase in the intestinal disturbance in this way. The attacks of tetany were usually preceded by a rise in temperature, which was likewise a warning.

CONSTIPATION.

Von Sohlern² discusses **spastic obstipation**, reporting several illustrative cases. The most important symptoms are constipation associated with spastic, cramp-like pains; and the appearance of "stiffened" areas of the intestine, which are distinguished from mere collections of feces by the fact that they cannot, like the latter, be kneaded, leaving impressions. The feces are never normal. They are always excessively dry and usually very hard, and are passed in portions of small diameter. These pencil-shaped feces are not absolutely characteristic of this condition, but are almost always found in it. There are usually the general signs of neurasthenia or of hysteria. The most important sign is the palpable stiffening of the intestine. The author believes that in these cases there is an **abnormal poverty of microorganisms in the intestine** and a minimal desquamation of epithelium. In the painful period the small amount of feces passed is always striking; and the peculiar, yellowish-white color of the hard fecal masses is such as to make them resemble dogs' feces. In the treatment the author **recommends emphatically rest and warm applications**; hot applications during the day, with a Priessnitz bandage at night. He then gives bromids at first, and very small oil-enemas, containing some chloral hydrate; and he also administers tincture of belladonna. Drastic purgatives should never be used; and the **bowels should be moved only by very mild enemas**, or by the mildest kinds of laxatives. Massage and electricity he considers to be contraindicated.

A. Bum³ demonstrated to the Vienna Medical Society a man of 22 with **spasm of the abdominal muscles** and of the anterior muscles of the thigh, and also with spastic obstipation. The muscle spasm was

¹ Lancet, March 28, 1903.

² Berl. klin. Woch., Sept. 29, 1902.

³ Zent. f. innere Med., Jan. 3, 1903, p. 29.

considered to be functional. G. Singer also discussed spastic obstipation, dividing it into the **symptomatic and the idiopathic forms**. The latter occurs in neurasthenic and in hysterical persons. It is associated with dyspeptic symptoms, and with pain in the regions of the umbilicus and the cecum. The amount of bowel movement is reduced and defecation is extremely difficult. Not infrequently, bowel movements occur very often. The large bowel may often be determined to be contracted into a band-like mass. There may even be symptoms of spastic ileus. Examination of the rectum with the finger or with the speculum will show that the **external sphincter is rigidly contracted**. The internal sphincter may also be rigidly contracted, but there is nothing else to be found. Often there are characteristic localized points of tenderness over the abdomen. The feces may be of varied appearance. In the most pronounced cases they are very narrow, pencil-like masses. The most important questions in the diagnosis are sterecoral colic, wind colic, chronic lead-poisoning, gastric crises, invagination, and enterostenosis. The prognosis is usually satisfactory. The best treatment is the use of bougies in the rectum. Saline and other purgatives should not be used.

L. J. Herschman¹ discusses the cause of obstipation, and insists that it is usually due to **enlargement of one or more of the rectal valves**. He believes that these valves undoubtedly exist, and presents some diagrams made from studies of the rectum. He thinks that the condition may frequently be satisfactorily treated by incision of these valves through a rectal speculum, by means of special instruments that he has devised.

S. Cohn² gives a detailed discussion of the use of **electricity in treating habitual constipation**, and describes some very favorable results that he has obtained by this method.

COLITIS.

T. S. Wilson³ contributes an article on **colon catarrh**. He divides the cases into simple acute catarrhal colitis, subacute and chronic simple membranous colitis, mucous colic, and true catarrhal typhlitis. In mentioning acute simple colitis, he refers to the **marked cardiac depression** that is often seen, which was striking in 3 cases that he has observed. In one case the pulse fell as low as 40 per minute. Under subacute and chronic catarrh of the colon he discusses some points at length. The author thinks that small amounts of mucus occurring in constipation are important evidences of the presence of catarrh of the colon. He insists particularly upon the importance of muscular irritability of the colon, as indicating disease of that viscous, especially noting the **rigid dilation of the colon** that may frequently be observed upon careful examination, and that may be seen to disappear and reappear from time to time. Pain is a very common symptom, and it is

¹ Med. Rec., May 16, 1903.

² N. Y. Med. Jour., Sept. 6, 1902.

³ Brit. Med. Jour., Dec. 6, 1902.

important to note its character. It often comes on an hour or more after meals. It is frequently brought on or increased by exertion, particularly if exercise is taken shortly after a meal. It is very likely to occur at night. It is often mistaken for the pain of gastric flatulence; but alkalies, carminatives, etc., produce no effect. Wilson believes that many supposed cases of gastralgia are really instances of pain due to catarrh of the transverse colon; and catarrh of the cecum may lead to a diagnosis of appendicitis. The important point is that the pain is likely to accompany or precede defecation. Nervous symptoms are often prominent, particularly unreasoning depression of spirits; and there may be vomiting or rumination. Gastric hypersecretion is a common reflex symptom. Malnutrition is sometimes very marked. In regard to diagnosis, the author refers particularly to the distinction from appendicitis in cases of what he terms catarrhal typhlitis. When tenderness and resistance persist after an attack suggesting appendicitis, catarrhal typhlitis may be diagnosed if prolonged gentle pressure causes the resistance and tenderness to disappear after a time, indicating the relaxation of an irritable and contracted cecum. Also, if the abdominal wall is rigid and if the iliac border of the cecum cannot be defined, inflammation of the appendix must be suspected. If the mass in the right iliac region has the character of a large cylinder, and both its inner and its outer wall can be defined by palpation, the probability is in favor of catarrhal typhlitis and against appendicitis. In distinguishing the hardening of the gut seen in catarrh from that seen in obstruction, the author insists that in catarrh hardening of the gut coincides with dilation, while in obstruction the periods of hardening are associated with a diminution in the diameter. He insists [without giving any good reason] that the key to treatment is in recognizing the relation to gout and the uric-acid diathesis. In acute cases he uses salicylates, and in more chronic cases salol; and he insists upon the importance of eliminating from the diet all articles of food liable to leave much indigestible residue —directly the contrary of the method of treating ordinary atonic constipation. He particularly insists upon the danger of confusing this condition with gastric disease. [It is often difficult to see upon what grounds such cases are attributed to "uric-acid diathesis." It is also pretty difficult to establish with safety a diagnosis of "catarrhal typhlitis" as distinct from appendicitis.]

J. A. Lichty,¹ in discussing the **etiology of mucous colitis**, refers to the belief of some authors that the condition is usually dependent upon the mechanical effects of ptosis of the abdominal organs. A large percentage of the patients with mucous colitis that he has seen exhibited ptosis of the abdominal organs. Of the 21 cases of mucous colitis mentioned, 16 had ptosis and 4 were not especially examined as to this point. The reason that displacements of the abdominal organs occur so frequently without producing mucous colitis is, he believes, that the displacement is ordinarily compensated for. When compensation is lost or disturbed, mucous colitis is likely to occur. Of the 21 cases

¹ Amer. Med., Aug. 9, 1902.

mentioned, 17 were in females and 4 in males. He mentions having seen 313 cases of splanchnoptosis, and that 31 of these occasionally showed stringy mucus in the stools. The symptoms of colitis were absent.

DYSENTERY.

L. Rosenthal¹ has investigated 85 cases of **dysentery in Moscow**, and has found that there, also, the disease is evidently due to the bacillus described by Shiga. He found this bacillus present in all these cases. The blood and the urine were sterile. In one case of postdiphtheric suppuration of the knee-joint he found only staphylococci in the pus. Agglutination reactions were positive and specific. The author also reports one instance of dysentery bacillus septicemia. He was unable to produce dysentery in animals with these bacilli.

A. Chantemesse² presents a communication that, he believes, demonstrates that the bacillus that he described in 1888 with Widal is the same as that since described by Shiga, Flexner, Kruse, and others, as the cause of epidemic dysentery.

G. Dock³ reports a case of **amebic dysentery** that occurred in a native of Michigan who had not been out of that State since 1893. After reviewing the etiologic relationship of the ameba to dysentery, he states that he investigated more than 200 patients of various sorts, after giving Carlsbad salts, and found amebas present in the stools in only 2 cases, the one reported and one of cancer of the rectum with diarrhea. In the latter case the amebas had not all the characteristics of Amoeba coli. The author therefore states that Schuberg is wrong in his contention that amebas are present in about half of all normal intestines. He insists upon the importance of a careful study of amebas and of amebic dysentery, and emphasizes the fact that **amebic dysentery is a more widespread disease** than it is commonly considered to be.

J. Evans⁴ reports a case of **gangrenous dysentery in which recovery occurred**. The patient, a man of 44, during a grave attack of dysentery that occurred 6 days after admission, exhibited marked tympany, persistent vomiting, cramping pains, and collapse. His stools, instead of being mucoid, became "like the washing of flesh" and had a horrible odor. He had severe hemorrhage, and passed many gray and black sloughs and a large tube-like mass. The next day he improved, and he gradually went on to entire recovery.

Kruse⁵ discusses **serum therapy in dysentery**, and describes his own method of producing a serum. This serum he found to be sufficient, in doses as small as the $\frac{1}{8000}$ part of a gram, to prevent death in a guinea-pig after what was otherwise a lethal dose of dysentery bacilli. He also found that when the serum was added in minute doses to human blood-serum that had been infected with dysentery bacilli, the bacilli, instead

¹ Deut. med. Woch., Feb. 5, 1903.

² Bull. de l'Acad. de Méd., July 22, 1902.

³ Jour. Am. Med. Assoc., Sept. 13, 1902.

⁵ Deut. med. Woch., Jan. 1 and 15, 1903.

⁴ Brit. Med. Jour., Sept. 13, 1902.

of growing, soon showed swelling and granulation; and after a few hours they had disappeared entirely, with the exception of a few granular remnants. The author has treated 100 human cases with this serum, with 8 deaths. The mortality is usually 2 or 3 per 100 larger than this. He believes that in this series 3 cases should have been excluded, because the patients were practically dying when the treatment was begun. Many of the patients were gravely sick when the treatment was instituted. He especially refers to the fact that 19 of the patients were less than 10 years of age, and that only one of these died—which is an **unusually small percentage of mortality** in young children. The temperature was also strikingly influenced, a rapid fall having followed the injections. He believes, likewise, that the severity of the symptoms rapidly decreased, that the disease was of shorter duration, and that convalescence was more rapid. He considers that the prophylactic use of the serum would give the best results.

F. H. Weisenburg,¹ in reference to the **treatment of tropical dysentery with sulfur**, states that while he was serving in Manila it was learned that a large effervescent sulfur spring had a reputation among the natives for curing diarrheas. A camp was established at this spring, and the patients with dysentery were treated with its water. The acute cases rapidly improved and soon became quite well; the chronic cases showed gains in weight and strength, and their bowel condition slowly improved, all being discharged cured within periods ranging from 3 to 6 weeks. Sometimes the stools increased in number during the first few days of the treatment.

F. Goldsmith,² in discussing the treatment of tropical dysentery, refers to the fact that he has **used methylene-blue in enemas**, giving 9 grains in 2 pints of saturated solution of boric acid. He thinks that the results were extremely satisfactory. When there was much tenesmus, he preceded the injection with a hypodermic of morphin. Two of these injections usually sufficed to give great relief.

APPENDICITIS.

S. J. Meltzer³ considers it important to observe the contraction of the iliopsoas muscle as an aid in the diagnosis of abnormalities in the iliac fossa, and particularly as an aid in the location of an abnormality. The patient should by his own exertion keep his foot slightly off the bed, and then flex his thigh upon his abdomen. Abduction and adduction may also be used to advantage, the iliopsoas being meanwhile palpated. This gives one a landmark; it brings the viscera in the fossa nearer the palpating finger; and it produces some useful movement of the viscera over the surface of the iliopsoas. It enables one to differentiate between growths in the bone or in the periosteum beneath the muscle and growths in the viscera overlying the muscle. It also enables one to outline the sigmoid flexure with some readiness, and to dis-

¹ Phila. Med. Jour., March 14, 1903. ² Australasian Med. Gaz., Dec. 20, 1902.

³ N. Y. Med. Jour., July 19, 1902.

tinguish appendicitis from circumscribed myositis of the abdominal muscle.

C. J. N. Longridge¹ contributes figures in a series of 20 cases in which the question of **leukocytosis in appendicitis** was studied. He believes that a progressive increase in the number of leukocytes indicates an increase in the severity of the inflammatory stage and the possible approach of pus-formation. A qualitative count of the leukocytes is of still more importance than is a quantitative count. Leukocytosis may be absent in appendicitis, if the disease is of the mild catarrhal variety; if it is of a fulminating character and the patient's resistance is low; and if an abscess of considerable duration is present, but is thoroughly walled off.

H. Rubritius² reports a case of appendicitis that exhibited the **clinical course of tuberculosis of the peritoneum**. There was a gradual collection of free fluid in the abdominal cavity for a period of 6 weeks, marked diarrhea, and frequent vomiting. There was no fever, except after tapping, when there was a slight rise in temperature. Numerous masses were found in various parts of the abdomen, and there was a circumscribed area of meteorism in the right side of the abdomen. The latter was thought to be due to the retraction of the small intestine into the right half of the abdomen, resulting from contraction of the mesentery. There was also an inflammatory infiltration around the umbilicus. Autopsy showed a seropurulent peritonitis and a perforated appendix. Several similar cases are referred to. In a note to this article, v. Jaksch refers to the condition as perityphlitis larvata, and states that since laparotomy would probably have cured this patient, he believes that that operation should be performed in cases that exhibit the picture of tuberculosis of the peritoneum. Even when the condition proves to be tuberculosis, the laparotomy is likely to do good.

INTESTINAL ULCERATION.

Litten³ demonstrated to the Berlin Medical Society the preparations from 6 cases of **duodenal ulcer** in which the ulcer had been an accidental finding at autopsy. In 5 of the cases there had been no dyspeptic symptoms during life. In 1, there had been some gastric pain.

Gutmann⁴ demonstrated to the Berlin Medical Society a specimen of **multiple ulcers of the intestine** from a woman of 40 years who for 6 months had had diarrhea, intermittent fever, and marked weakness. Autopsy showed many contracted areas along the intestine, which corresponded to circular ulcers. Some caseous glands were found in the retro-peritoneal tissue. Tubercle bacilli and giant-cells were absent. The ulcers had all the **characteristics of syphilitic ulcers**.

¹ Lancet, July 12, 1902.

² Mitt. a. d. Grenzgeb. d. Med. u. d. Chir., Bd. x, Hefte 1 u. 2.

³ Zent. f. innere Med., 1903, p. 383. ⁴ Zent. f. innere Med., 1903, p. 383.

INTESTINAL STENOSIS.

H. Schlesinger¹ discusses the diagnosis of multiple stenoses of the intestine, and states that in 2 cases recently observed he has been able to make the **diagnosis of multiple stenoses**, even though palpable tumors were absent. If several tumors can be felt and there are symptoms of stenosis, one naturally expects that the stenosis will be found to be multiple. When tumors are absent, however, the author thinks that the following points are sufficient to justify the diagnosis: (1) The repeated observation of "stiffening" of portions of the intestine in various regions that lie at a distance from each other, these portions of the intestine not being connected by rigid portions. (2) The occurrence of this "**stiffening**" of the intestine in different attacks in approximately the same locations. (3) The disappearance of this contraction together with loud gurgling sounds. (4) A history that indicates the presence of tuberculosis or of syphilis. In the 2 cases in which the diagnosis was made, operation showed, in one instance, 12, and in the other, 3 stenoses. One patient recovered entirely after resection of the stenosed area; the other died of peritonitis.

M. Loeb² describes the case of a man of 30 who had had a syphilitic infection, and who developed enlargement of the liver and became greatly emaciated. He at first improved upon potassium iodid, but afterward grew worse, exhibiting abdominal pain, severe constipation, and vomiting. Examination showed a tumor of stony hardness in the right iliac region, appearing to connect with the bone. This suggested an osteosarcoma. The patient continuously grew worse, and finally died of exhaustion, with signs of obstruction. The necropsy showed gummas of the liver. The **stony mass in the iliac region** was found to be composed of dense connective tissue in which the intestines were inclosed, it being impossible to dissect them out.

J. A. Scott³ reports a case of acute **intestinal obstruction caused by gallstones**. The patient was a woman of 67 that had had signs of gallstones for some years before, though the history was not clear. The fatal attack came on after a dietetic error, with severe colicky pains and signs of intestinal obstruction. After consultation it was decided that the obstruction was mechanical, and operation was postponed; but it was undertaken later, and about a foot of the bowel was found necrotic. This area was resected, and a large gallstone, which had obstructed the gut more or less completely, was removed from just below. The patient died a few hours afterward. The examination of the bowel showed it to be infiltrated with pus. The stone measured 4.5 by 2.5 cm.

Treatment.—O. Loewi⁴ contributes an article on the **synthesis of albumin in the animal body**, which is of decided interest in relation to dietetics. It has been taught for many years that the extractive substances and the products of albumin-digestion that have passed beyond

¹ Zent. f. innere Med., Jan. 10, 1903.

² Zent. f. innere Med., Jan. 17, 1903.

³ Phila. Med. Jour., Dec. 27, 1902.

⁴ Arch. f. exper. Path. u. Pharmak., Bd. xlviii, Hefte 5 u. 6.

the peptone stage are of no value in the production of tissue. Recent work by a number of authors has indicated that this teaching is probably incorrect. Loewi now presents the results of some experiments with the products of pancreas self-digestion, all biuret-containing substances being absent. He was able to demonstrate that when this form of nitrogenous food is used to the exclusion of all other nitrogen, it is possible to maintain an animal in nitrogen-balance, and even to make it retain appreciable amounts of nitrogen. This he considers an absolute demonstration that these **biuret-free nitrogenous substances act as tissue-producers**. A comparison with the effect of meat itself showed that the latter is somewhat more effectual than the end-products of digestion. The author makes some interesting remarks concerning the absorption of albuminous substances and the portion of the organism in which synthesis occurs. He believes that practically all the nitrogenous food we take is digested beyond the peptone stage, and is absorbed in this form into the blood-stream, there uniting with "combining bodies," which further the union of the products of digestion with the various cells of the body; and that the cells build up the lower substances into albumin. The albumin, in other words, is not carried to the cells in the form of albumin. [Numerous other recent investigations point toward the probable correctness of these opinions.]

Bendix¹ demonstrated to the Berlin Medical Society a child of 13 months that exhibited a curious **idiosyncrasy toward eggs**. The use of even a minute amount of egg in its food caused the child soon afterward to develop an extensive urticaria. Other foods did not have this effect. The author considers it possible that urticaria may be due to such idiosyncrasies in an appreciable number of cases. Albu mentioned a similar case, in which the ingestion of eggs caused a bullous exudative erythema. Michaelis suggested that the erythema might have been due to the direct absorption of the egg-albumen, but Bendix considered this impossible, since it had occurred after the eggs had been boiled. [An idiosyncrasy toward eggs, of more or less marked degree, is not uncommon. It seems to be ordinarily caused by the yolk.]

D. L. Edsall and C. W. Miller² report a study of **2 patients nourished exclusively per rectum**, with a determination of the absorption, of nitrogen metabolism, and of intestinal putrefaction. Both were cases of gastric ulcer that had had severe hemorrhage. Both, on rectal alimentation, showed rapid emaciation. The figures obtained show, in the first case, the absorption of only 39.8 % of nitrogen and 13.6 % of fat; the second patient apparently absorbed 47.5 % of nitrogen and 33.4 % of fat. The total food-value absorbed in the first case was only about 212 calories per day; and in the second, about 319. Both patients needed about 2000. The literature of the subject is reviewed, and the authors decide that **fats are very badly absorbed** when administered per rectum, and that **nitrogenous foods are but very imperfectly absorbed**. They also report some estimations of the ethereal

¹ Zent. f. innere Med., March 28, 1903, p. 334.

² Univ. of Pa. Med. Bull., Jan., 1903.

sulfates. These show that in the case in which absorption was the better there was a marked degree of intestinal putrefaction. The authors believe that much of what has usually been considered to be absorption of food is **really bacterial putrefaction** of food—a view that corresponds with that of Reach concerning the carbohydrates. They decide that only in exceptional cases may rectal alimentation provide enough food to prevent tissue-loss; and even then, only when the patient is already greatly reduced and in a condition of pronounced subnutrition. Ordinarily, this cannot be accomplished; and the patient is then provided with only a very small part of the amount of food necessary to maintain him in nutritive equilibrium.

P. Deucher¹ gives a **general discussion of the use of rectal enemas**, particularly referring to the decomposition processes that readily go on under these circumstances, and that tend to irritate the intestine and to prevent proper absorption. He thinks that the use of milk in rectal enemas is not to be recommended, as the milk readily undergoes decomposition and is, at best, very poorly absorbed. Of albuminous foods, eggs are most readily absorbed, when given with salt. If milk is given at all, it should be previously peptonized; and the author recommends, as the best enema eggs with the addition of salt, sugar-solution, and some opium. He thinks it entirely **impossible to maintain the nutritive balance of the organism** by nourishment given solely through the rectum.

R. Ehrstrom² contributes a study of the **nutritive value of casein enemas**, basing his conclusions chiefly upon a study of phosphorus metabolism. He finds that enemas of milk and of proton are well absorbed and assimilated, and he believes that the addition of proton to nutritive enemas makes it possible to furnish a considerable amount of albumin to the tissues. [These results with milk are not in consonance with those of most investigators.]

Tunnicliffe³ considers **phenolphthalein a good purgative**, particularly in cases of icterus. He states that it has no irritating effect upon the kidneys and little depressing action upon the blood-pressure. The ordinary dose for adults is from $1\frac{1}{2}$ to 4 grains.

L. von Aldor⁴ reports a series of cases of catarrh of the large intestine that he has treated with **high injections**. The main points insisted upon by him are, first, to use a cleansing enema, then to **introduce a tube at least 85 cm. long**. This tube should be introduced throughout the whole of its length. The temperature of the fluid employed should be at least 45° C. One should, at the same time, **use warm applications** for some hours afterward over the abdominal wall. The cases reported showed rapid improvement under the method, and the author attributes this improvement largely to the high injections, to the high temperature of the fluid employed, and to the warm applications to the abdomen.

J. Boas,⁵ in connection with the article of Aldor, refers to his own work

¹ Korresp.-Bl. f. schweiz. Aerzte, No. 2, 1903.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4. ³ Brit. Med. Jour., Oct. 18, 1902.

⁴ Berl. klin. Woch., May 11, 1903. ⁵ Berl. klin. Woch., June 1, 1903.

and that of others, indicating that it is **impossible to pass a rubber tube for any considerable distance** into the large intestine. He himself has been unable to do this in many experiments, and he has also been unable to introduce a gastrodiaphane into the colon beyond the third sphincter. He thinks that Aldor has merely deceived himself into the belief that he has introduced a tube as far as 85 cm. One may easily introduce a tube, but will find it rolled up in the rectum. Fluids, however, may be introduced; and it may readily be shown that they rapidly traverse the whole of the large bowel, and appear within a few minutes through a cecal fistula in animals or in human subjects.

W. N. Clemm¹ discusses the use of **gelatose-silver nitrate** (albargin—Höchst) in the treatment of diseases of the large intestine, particularly in cases of chronic constipation and of mucous colitis. His method of treatment is to administer in the evening an enema containing half a pint of water with about 6 grains of the albargin in it; and he claims that it has an excellent effect upon the mucous membrane, insinuating itself into the intracellular spaces. With ordinary forms of nitrate solutions, on the contrary, the silver becomes united with albumin on the surface, and has a local caustic action, not penetrating deeply. The results that he reports were, he claims, excellent. [There are a number of other organic preparations of silver which are equally good, and with which we have had excellent results in irritative conditions of the colon and rectum.]

DISEASES OF THE LIVER.

METHODS OF EXAMINATION.

Hamel,² in cases of **suspected icterus** in which the urine does not show the presence of bile-pigment, recommends that blood be obtained in capillary tubes about 10 cm. long and 1.5 mm. in diameter, which should be stood vertically for some hours, after the ends have been closed with sealing-wax. After this time the serum and clot will have separated, and the color of the serum can be carefully observed. The author states that even in icterus of slight degree the serum will be found to have a yellow color. The diagnosis of icterus can often be made in this way much earlier than by an examination of the urine.

J. Bouma³ concurs with Hamel in the statement that **bile-pigment may often be found in the blood** when it is not present in the urine. He describes a case of hypertrophic cirrhosis of the liver in which the blood-serum contained bile-pigment, but in which the urine contained none, although it did contain a large amount of urobilin. [He does not state whether the blood-serum was examined for urobilin—a matter of importance in relation to the source of production of urobilin.] As to the **method of demonstrating** the presence of both bile-pigments and urobilin, the author states that the best procedure is to add 2 cc. of a 10 %

¹ Arch. f. Verdauungskrankh., Bd. ix, Heft 1.

² Deut. med. Woch., Sept. 25, 1902.

³ Deut. med. Woch., Nov. 27, 1902.

calcium-chlorid solution (instead of barium chlorid) to 8 cc. of fresh acid urine. The acidity is then carefully neutralized with ammonia (it must not be made alkaline). A precipitate forms, and may be centrifugated off. The fluid will then show the urobilin band, if this pigment is present; or the sediment may be shaken with water, centrifugated again, and dissolved in Obermayer's reagent. If bile-pigment is present, a green color that gradually becomes bluish-green will appear. In this way, the author states, most minute quantities of bile-pigment may be found. The oxidation is never carried too far by the Obermayer reagent. In examining the blood-serum for bile-pigment, he takes 2 cc., adds 6 cc. of distilled water, 1 cc. of a normal solution of neutral sodium phosphate, and 1 cc. of a normal solution of barium chlorid. He then centrifugates. The sediment is shaken with water and centrifugated, and the precipitate is tested with 5 cc. of a mixture of 1 part Obermayer's reagent and 4 parts alcohol.

M. Nakayama¹ discusses a **modification of Huppert's reaction** for bile-pigments. Five cubic centimeters of acid icteric urine should be placed in a centrifuge-tube, the same amount of 10 % barium-chlorid solution being added and mixed with the urine. The whole is then centrifugated. The clear supernatant fluid is decanted, and the precipitate treated with 2 cc. of a reagent consisting of 99 parts of 95 % alcohol and 1 part of fuming HCl, in each liter of which mixture 4 grams of iron chlorid have been dissolved. When bile is present, the fluid shows a brilliant green or bluish-green color. If then one adds nitric acid containing nitrous acid, the bluish-green color becomes violet or red.

GENERAL CONSIDERATIONS.

L. Pflughoeft² has made an experimental study of **the effect of exclusion of the liver upon the freezing-point of the blood**, tying off the various vascular connections of the liver and determining the freezing-point both before this procedure and afterward at the time of death as the result of the procedure. The result was to show that the changes in the freezing-point were but slight; and the author does not think that they can in any way be made responsible for the grave and finally fatal symptoms, particularly the severe nervous symptoms, that result from this operation. He believes that this is further important evidence of the correctness of the position of Bickel and others who insist that **cholemia is not due to mere chemicophysical effects** of extensive disease of the liver, but to specific poisonous substances.

L. Ferrannini³ reports a series of **cryoscopic examinations of the urine and of ascitic fluid** in diseases of the liver. He reaches no conclusions of any practical importance. He states that ascitic fluid had a cryoscopic index of from -0.55° to -0.75° . The freezing-point of the urine varied in the different forms of liver-disease.

L. Ferrannini,⁴ who is apparently unacquainted with the work of

¹ Zeit. f. physiol. Chemie, Bd. xxxvi, p. 398.

³ Zent. f. innere Med., March 14, 1903.

² Deut. med. Woch., May 14, 1903.

⁴ Zent. f. innere Med., Sept. 13, 1902.

Strauss upon the same question, reports some investigations regarding **alimentary levulosuria and glycosuria in diseases of the liver.** He tested 16 cases of liver-disease, and found that in 15 instances the tests for levulose were positive, while glycosuria could be produced in only 10. The cases that did not exhibit the latter were instances of chronic malaria and of stagnation-icterus in syphilitic subjects. Of the 10 positive cases of alimentary glycosuria, it was necessary in 7 to use the test recommended by Reale, the quantities of glucose being very small. This test consists in a preliminary precipitation with lead-acetate, and the precipitation of this filtrate with ammonia. The latter precipitate is then dissolved in sodium hydrate and sodium tartrate, and tests are made with this solution. In 11 of the 15 positive cases, the quantities of levulose were sufficient to be discovered by ordinary methods; in the other 4, the result was positive only after the use of Reale's method. These latter cases were 2 of chronic malaria with enlargement of the liver, 1 of stagnation-icterus with enlargement and ptosis of the liver, and 1 of tumor of the liver and mesentery. The author recommends that alimentary levulosuria be used as a test for disease of the liver, and particularly as a test for disturbance of its glycogen-producing function. [We have used this test in a number of cases and incline to the belief that it is not very helpful.]

R. von Jaksch¹ reports a study of the relative percentages of the **different forms of nitrogenous substances in the urine.** He studied the phosphotungstic-acid precipitate and the filtrate; and in the filtrate the two fractions that yield ammonia easily in the one case, with difficulty in the other. The nitrogen of the precipitate showed no very noteworthy changes in any condition studied. The other fractions, however,—the one representing chiefly the urea; the other, chiefly the amido-acids,—showed interesting changes. The urea-fraction was reduced, to a considerable extent, in nephritis, and this was apparently the only striking alteration in that disease. The amido-acid fraction, on the contrary, showed no change in nephritis, but was very largely increased in 2 cases of hypertrophic cirrhosis of the liver and one of diabetes insipidus, and also in typhoid fever. The result in typhoid fever is not surprising, because oxidative processes in general are reduced in most severe acute diseases. In hypertrophic cirrhosis of the liver the result is of considerable consequence. Leucin and tyrosin are found in such large amounts in acute yellow atrophy and phosphorus-poisoning that it is not wholly surprising to find an increase of the amido-acid nitrogen in hypertrophic cirrhosis [but it is an important observation; and it seems possible that a study of the amido-acid nitrogen may lead to some further points of value in the diagnosis between liver-diseases and some other conditions—and perhaps between the different forms of disease of the liver]. The amido-acid nitrogen was also increased in diabetes insipidus.

¹ Zeit. f. klin. Med., Bd. xlvi, Hefte 1 u. 2.

ACHOLIA.

W. B. Cheadle¹ gives an interesting lecture on acholia, using this term to describe a condition that he considers by no means uncommon, but one that has received only scanty consideration from either the clinical or the pathologic standpoint. He means the condition that is characterized by the absence of bile in the stools, but **without jaundice or the signs of obstruction** to the flow of bile from the biliary ducts. It is a condition particularly common in children. It has been described by Gee under the name of celiac disease, and has also been discussed by others. The condition may, however, be met in adults; and the name has been used as indicative of sprue. In adults this condition of the stools is met not infrequently in persons who live highly and are of gouty habit. In such cases it is likely to be a temporary condition only. The more serious and striking cases are those in which it is persistent; and the gravest type of the cases frequently met is sprue, or white diarrhea. In children, the onset of acholia is likely to be sudden. It is associated with an indefinite disturbance of health, abdominal distention, and slowly progressing emaciation. Several cases in children are described. The condition is less common in adults; but in an adult a case that was evidently of the type of sprue was described. The author inclines to the belief that the condition is due to a **defect in the transformation of bile-pigments into urobilin.** It is probable that the functions of both the liver and the pancreas are interfered with. No definite lesion has been described postmortem. Cheadle thinks that the condition is most common in the spring, in cold, damp weather. In children, however, he believes that it is due chiefly to reflex trouble from difficult dentition. Treatment should be directed largely to easing the work of the liver and the pancreas, fats and starches being, as far as possible, predigested; and the diet in general being carefully watched. As to drugs, the author uses bismuth, and, if necessary, opium, if the bowels are loose; and also intestinal antiseptics. He likewise administers drugs that stimulate blood-formation and that are supposed to stimulate the activity of the liver.

CIRRHOSIS.

W. H. White,² in discussing **some misconceptions with regard to disease of the liver**, insists that real cirrhosis of the liver is due purely to alcoholic drinks, though not solely to the alcohol contained in them. He thinks that syphilis produces only rare cases of jaundice, but that it more frequently produces the characteristic puckered and scarred syphilitic cirrhosis and the hard gray liver of congenital syphilis. He objects to the statement that malaria and many other conditions produce cirrhosis of the liver. In his belief, true cirrhosis of the liver due to biliary obstruction is extremely rare. Excluding Hanot's hypertrophic cirrhosis of the liver, which he considers to be rare and to occur exclusively in children, he does not admit that any distinction should be drawn

¹ Lancet, May 30, 1903.

² Brit. Med. Jour., March 7, 1903.

between hypertrophic and atrophic cirrhosis, these being merely two stages of one condition. The distinctions that have been made between them are, in his opinion, quite insufficient to prove that they are two separate conditions. In referring to the symptoms, he mentions his view as to the **great gravity of ascites from the prognostic standpoint** in uncomplicated cirrhosis, to the great rapidity with which it may develop, and to his belief that it cannot be due merely to portal obstruction; he thinks it to be due to some toxemia. Jaundice also, in his opinion, is due to toxemia, and not to simple obstruction. [There is much reason for considering these opinions to be correct.] He insists upon the frequency of swelling of the feet in cirrhosis of the liver, even in cases in which it cannot be due to pressure. He thinks that it, also, is toxic. The anemia and the hemorrhages he believes must be toxic likewise. All these indicate that hepatic cirrhosis is not a local, but a general disease. As to primary malignant disease of the liver, the author states that in 10,000 necropsies at Guy's Hospital he found **only 1 case of undoubted primary malignant disease** and 24 cases in which the malignant disease of the liver was secondary to growth elsewhere. He insists upon certain differences between primary and secondary malignant disease. The primary disease is rapidly fatal. In the series mentioned unless the cancer was of the scirrhouus variety, the liver was always enlarged. There was no jaundice in 4 out of 10 cases; in 2, it did not appear until just before death; and in 3 that showed it, it was slight. It never became deep. The temperature was often raised.

G. G. Sears and F. T. Lord¹ contribute an interesting study of 78 autopsy cases of hepatic cirrhosis, with particular reference to the percentage of cases in which the grave symptoms in connection with hepatic cirrhosis were due to other complicating disease, rather than directly to the cirrhosis of the liver itself. The conclusions reached are that in the majority of cases **hepatic cirrhosis is but one expression of a systemic poisoning**; and that degenerative changes found in other organs are a part of this general process, rather than complications of the liver-disease. The splenic tumor and the dilated veins are partly due to portal obstruction, but are also dependent upon the general toxic cause. They are occasionally associated with but slight hepatic changes. Dilatation of the vessels may have some compensatory action, but this is rarely sufficient to prevent ascites. Persistent jaundice and hemorrhage from the digestive tract rarely occur until the connective-tissue formation is well advanced. Hemorrhage was usually due to a gross lesion—most commonly an esophageal varix. The cases were grouped into four classes, according to the excess in the amount of connective tissue in the liver. Ascites occurred in practically the same percentage in all these classes, and was usually a late symptom. Its early appearance was, with rare exceptions, associated with some form of peritoneal inflammation. Continuous fever was never observed by the authors, except in the presence of complications. Brief elevations of temperature, without discoverable cause, were occasionally seen. No evidence was found that the course of

¹ Boston M. and S. Jour., Sept. 11, 1902.

the disease is not always progressive. A high grade of cirrhosis, however, was sometimes present without incapacitating the patient. One of the most important of the authors' conclusions is that **surgical treatment may be indicated in a very small proportion of cases**, but that conclusive evidence is still lacking that the ascites in the cases said to have been successfully operated upon was due to hepatic cirrhosis, and not to coincident conditions. They **admit as operable** practically only those cases in which the fibrotic changes in the liver are probably far advanced, but in which the heart and kidneys are practically sound, and the general nutrition is so well maintained as to indicate that glandular structure sufficient to maintain the function of the liver is still present. Competent medical treatment should also have failed before surgical treatment is undertaken.

Von Eisenmenger¹ discusses **stagnation-cirrhosis** of the liver. As the result of his study of 100 cases and of the literature of the subject, he opposes the view that circulatory stagnation in the liver produces cirrhosis. He does not consider that actual transformation of the liver-tissue into cirrhotic tissue occurs as the result of venous stagnation. The liver in this condition does at times show some local areas of hypertrophy or local patches of atrophy. The latter, however, the author considers to be due to emboli. When cirrhosis does occur in circulatory stagnation, it is an entirely different picture, and the patient then exhibits a combination of circulatory weakness and cirrhosis; but the latter is not secondary to the former. The author thinks that the condition that is due to circulatory trouble should be called stagnation-induration. In the cases in which ascites is a marked symptom in cardiac incompetency, the **ascites is not caused by mere venous stagnation** in the liver, for this does not have sufficient influence upon the portal circulation to produce ascites.

F. Maixner² discusses what he considers to be a **special form of cirrhosis of the liver**, which he terms the hemorrhagic form. It is characterized by the **early and frequent occurrence of gastrointestinal hemorrhages**. As a rule these occur but exceptionally in cirrhosis. The author has observed the hemorrhagic form 7 times in 73 cases. The hemorrhage is likely to occur when the patient is apparently in entirely good condition, just as is hemoptysis in tuberculosis of the lungs; and the diagnosis at this time is likely to be gastric ulcer. Besides the hemorrhage, the patients usually present a peculiarly anemic look, decided enlargement of the spleen, and marked meteorism, often accompanied with diarrhea. Ascites is always present, but usually develops late; and it is not marked, except in the terminal stage. A recognizable collateral circulation in the abdominal veins was not observed in any of the cases. Anatomically, the enormous varicose enlargement of the lower esophageal veins was striking in these cases; while in the other cases of cirrhosis of the liver this was present only exceptionally, and was never so marked. The hemorrhages must also occur, however, from the vessels in the

¹ Zeit. f. Heilk., 1902, Bd. xxiii, Heft 4; Abth. f. path. Anat. u. v. Diätet., Heft 2.

² Wien. med. Woch., 1902, Nos. 32-40.

stomach and intestines. It was not possible to discover the bleeding vessels at autopsy.

Hildreth¹ discusses the use of **apocynum cannabinum** in some dropsical conditions. He thinks that it is often an excellent preparation in cases of dropsy, and that it has no cumulative action and no dangerous collateral effects after prolonged use. [The latter statement is certainly not safe. We have seen several cases in which very dangerous results have followed the use of this preparation.]

SYPHILIS.

C. G. Stockton² discusses syphilis of the liver from the clinical standpoint, particularly referring to some cases that he has observed, in which there was very marked **syphilitic enlargement of the abdominal lymphatic glands**, associated with marked hepatic enlargement and ascites. Rapid improvement occurred upon the institution of anti-syphilitic treatment. The author believes that the symptoms were due to the lymphatic enlargement, rather than to actual syphilitic disease of the liver itself. He reports a case of syphilitic hepatitis and some cases of gumma of the liver, and insists that too little attention is paid to this condition; that syphilis of the liver is an extremely important matter; and that usually it is incorrectly diagnosed as cirrhosis of the liver or carcinoma.

CYSTIC DEGENERATION.

B. Boye³ reports a remarkable case of cystic degeneration of the liver and kidneys in a woman of 56. Enlargement of the liver had been noted for 15 years before death, and, because of the hard, irregular mass, **had been considered carcinoma.** The patient had no noteworthy disturbance of her health until 3 years before her death. She had no icterus or ascites, but had occasional hematuria, with some pain in the abdomen and vomiting. When seen by the author, she had large masses in a great part of her abdomen. These were irregular and hard, and were taken for carcinoma even then. She died of apoplexy, and the necropsy showed that the liver consisted almost entirely of cysts; and the same was true of the kidneys. The two kidneys together weighed 1500 grams. The liver weighed 6700 grams. Microscopic examination showed that the **cysts arose from the bile-capillaries** in the liver, and from the urinary canaliculi in the kidneys.

HEPATOPTOSIS.

J. Dutton Steele⁴ has made an experimental study of the **effect of hepatoptosis in producing biliary obstruction** and jaundice. The method used was to determine the effect of dropping of the liver upon the pressure necessary to drive a salt solution of the same concentration as

¹ N. Y. Med. News, Oct. 11, 1902.

² Zent. f. innere Med., July 19, 1902.

³ Jour. Am. Med. Assoc., Nov. 8, 1902.

⁴ Univ. of Pa. Med. Bull., Jan., 1903.

bile through the cystic and the common duct. It was found that when the anterior portion of the liver was allowed to drop, the pressure required regularly increased, until, when the interior edge of the organ was 15 cm. below the ensiform, the necessary pressure had increased to 330 mm., while previously it had been 150 mm. This is apparently sufficient to explain the production of jaundice in these cases. **Abdominal pain is the most striking subjective symptom** in hepatoptosis. There are reported 44 cases in which autopsy or operation demonstrated the position of the liver and the presence or absence of gallstones; 37 of these had colic, and only 10 showed the presence of gallstones. Replacing the liver by operation or by other mechanical means almost always relieved the paroxysms; and if the organ remained permanently fixed, the attacks did not recur. Jaundice occurred in 14 of these 37 cases. Of the 44 cases mentioned, 15 showed jaundice without gallstones and without demonstrable lesions of the liver, or with only a secondary biliary cirrhosis. The jaundice in these cases is transitory and accompanies the attacks of colic; the closure of the ducts is, therefore, only temporary. It is probably due to chronic catarrhal conditions brought about through interference with the circulation. The reason jaundice does not regularly occur is that the closing of the ducts is, as a rule, too transitory to permit of the absorption of bile. Then, too, the obstruction may be in the cystic duct alone. A study of the cases reported shows no points of difference between the cases with jaundice and those that did not exhibit it. The obstruction is in the common or in the cystic duct, and is probably caused by the increase in the angle between the ducts and the gallbladder. The cases of floating liver with jaundice, but without gallstones, reported in medical literature are collected.

DISEASES OF THE BILE-PASSAGES.

L. von Miezkowski¹ reports a case in which, after cholecystectomy, colicky attacks of pain came on. These ceased only when a fistula, through which bile flowed, had spontaneously established itself in the operation-wound; 2300 cc. of bile escaped in this way within 24 hours. The amount of urine in the same time sank to 180 cc. In a study of the pressure in the biliary system in 19 cases of gallstone operation, it was found that the pressure varied from 0 to 710 mm. of water. Very low pressure was seen in the cases in which the gallbladder connected with the biliary channels, and marked increase in pressure was noticed only when the gallbladder constituted a closed cyst.

Coen,² after a series of studies of radiography in biliary calculus, reaches the conclusion that this procedure is, as yet, of little value in determining the presence of gallstones, even when these are present in the cystic or in the choledoch duct. This is chiefly due to the largely organic constitution of gallstones, and even more to the thickness of the

¹ Mitt. a. d. Grenzgeb. d. Med. u. d. Chir., Bd. x, Heft 5.

² Il Policlinico, Oct., 1902.

tissues in the neighborhood, which are more or less impassable to the *x-rays*.

Morris¹ reports an interesting **case of gallstone that simulated carcinoma**, the patient being a man of 67. He exhibited emaciation and an icteric tint of the skin, and had **repeatedly had hematemesis**. For 18 months he had had repeated attacks of severe and prolonged abdominal pain associated with vomiting. Hematemesis sometimes occurred with these attacks. A tumor could not be felt. An attack of collapse occurred, and was controlled by very active treatment. Upon regaining consciousness the patient complained of pain in the rectum. Exploration showed the presence there of a large gallstone, which was easily removed. Subsequently, the patient entirely recovered.

W. N. Clemm² reports the case of a man of 27 who had had several attacks of what seemed to be definite gallstone colic. The liver was enlarged and tender, and Boas's tender point on the right was pronouncedly present. In the most severe attack that the man had had, he suddenly **vomited a young roundworm**, about 10 cm. long. From this time the pain ceased entirely; the liver gradually regained its former size, and the tenderness over that organ disappeared. The author refers to other similar cases.

H. Ehret and A. Stoltz³ discuss inflammatory **stagnation-icterus in cholelithiasis**. The first case reported was one in which there was an intense chronic icterus without any compression of the common duct, and in which bile was absent from the intestine without any calculi in the duct. In the second case, in spite of the presence of 3 large stones, icterus was not present—or was, at most, extremely slight. The cause of icterus in these cases the authors believe to consist in a cholangitis that obstructs the smaller bile-passages, this icterus usually being of bacterial origin. They believe that **icterus in cholelithiasis is commonly of inflammatory origin**.

E. Galvagni⁴ reports a case of rapidly appearing, pronounced, and painful **swelling of the liver, associated with chills**, which lasted over 6 months and was accompanied with **irregular fever and with hemorrhagic pleurisy**. The case ended in recovery. The condition is not believed to correspond with any generally recognized disease. In a similar case, Bozzolo considered Diplococcus tetragenus to be the cause of the condition.

Schmidt⁵ reports a case that ran the clinical course of **pyemia, apparently arising from suppurative cholecystitis**. Examination of the urine during life showed a special variety of bacillus; and postmortem examination of the contents of the gallbladder, of liver abscesses, and of deposits on the tricuspid valve showed the same bacillus. It had most of the characteristics of the typhoid bacillus, but did not agglutinate with typhoid serum. [Paratyphoid infection seems a strong possibility in this case.]

¹ Brit. Med. Jour., July 21, 1902.

² Arch. f. Verdauungskrankh., Bd. viii, Heft 6.

³ Mitt. a. d. Grenzgeb. d. Med. u. d. Chir., Bd. x, Hefte 1 u. 2

⁴ Clin. med. ital., 1902, Nos. 3-7.

⁵ Wien. klin. Woch., No. 49, 1902.

Westenhoefer¹ demonstrated to the Berlin Medical Society the organs from a case of cholelithiasis in which the pressure of a calculus in the hepatic duct had produced **thrombosis of the portal vein** and a consequent severe intestinal hemorrhage. The cystic and choledoch ducts both contained calculi. The conditions found at necropsy were similar to those present in embolism or thrombosis of the mesenteric artery.

Von Leyden and Davidsohn² demonstrated to the Berlin Medical Society a case of **perforation of the gallbladder** with consecutive peritonitis. The patient had had repeated attacks of gallstone colic. Peritonitis developed 5 days before death, which was found to have been due to perforation. Leyden insisted that in these cases the peritonitis runs a very insidious course, and mentioned several instances in which this fact was shown. Senator, in discussion, drew attention to the fact that peritonitis following perforation of the gallbladder is distinguished from that due to perforation of other portions of the alimentary tract by the fact that no air escapes into the peritoneal cavity.

H. Strauss³ demonstrated to the Berlin Medical Society the specimens from a case in which a rupture of the gallbladder had occurred 34 years before and had healed spontaneously, by the production of a **fistula into the duodenum**. He also mentioned a case of cholelithiasis accompanied with fever and icterus, which was of interest in relation to the positive teaching of Pick that in such circumstances a marked leukocytosis means the presence of pus. This symptom was present in this case, but post-mortem examination showed an obstruction without any accompanying suppuration.

Eschenhagen⁴ reports a case of **fistula between the bile-passages and a bronchus** in a woman of 35. The case was one of cholelithiasis that had been followed by infectious cholecystitis and cholangitis, and this by multiple abscesses of the liver. One of these abscesses had broken into the right lung, and had produced signs of circumscribed gangrene with foul expectoration. Following this, the sputum contained considerable amounts of bile, which, as expected, was shown by the necropsy to be due to the fistula between the bile-passages and a bronchus.

L. v. Aldor,⁵ in discussing the internal treatment of gallstone disease, insists that the **most important basis of cholelithiasis** is inflammatory changes in the bile-passages. The removal of the gallstones overcomes the mechanical difficulty that, at the moment, is the most important. It does not, however, of itself, cure the disease, which should be treated as an inflammatory condition of the bile-passages. If there are any subjective or objective signs of inflammatory trouble remaining, the author requires the patient to remain in bed until these signs have disappeared. He applies cataplasms, as hot as the patient can bear them, from 7 A. M. until 12 M., and from 2 to 7 P. M. He also administers warm Carlsbad water every 2 hours, giving 0.75 liter to 1.5 liters during the day. He feeds his patients freely with a mixed diet, excluding

¹ Zent. f. innere Med., 1903, p. 189.

² Zent. f. innere Med., 1903, p. 242.

³ Arch. f. Verdauungskrankh., Bd. viii, Heft 6.

⁴ Zent. f. innere Med., 1903, p. 189.

⁴ Deut. med. Woch., July 24, 1902.

spices and irritating foods. This treatment is continued as long as there are any objective signs of the disease or any pain is felt. He claims that he can cure most cases within 4 or 5 weeks by this means, and in very few cases does he find it necessary to advise operation.

M. J. Rostoezew¹ reports a remarkable case of **extreme dilation of the common bile-duct** in a child of 13. The patient had, for some time, had a tendency to jaundice, and had had a very much enlarged abdomen, the enlargement varying somewhat from time to time. She was operated upon, and a cystic mass was found and opened, about 2 liters of fluid being emptied from the cyst. It had been previously thought to be an echinococcus cyst, but this proved to be an error. The child died soon after the operation, and the necropsy showed that the cyst was the enormously dilated common duct. There was a valve-formation at the entrance and exit, of such a character that the entrance of fluid into the cyst was possible, but that its exit was practically impossible. This valve-arrangement was undoubtedly the **cause of the cyst-formation**. It was possibly a congenital anomaly. In the 5 cases so far discoverable in the literature, the ages varied from 13 to 24 years. All were in females. The diagnosis of the condition must always be extremely difficult. If determinable at all, it can be definitely so only at operation; and it would probably be impossible to recognize the condition accurately even then. In this case a careful dissection was necessary in order to demonstrate the nature of the condition. Operative treatment would, of course, be the only successful way of managing the condition.

DISEASES OF THE PANCREAS.

Glaessner² reports his **studies of pancreatic secretion in a living human being**, the opportunity having been afforded to observe a case in which surgical intervention for obstruction of the bile-duct had made it necessary to introduce a drain into the pancreas through the duct of Wirsung. The pancreatic secretion amounted to between 700 cc. and 800 cc. a day. It contained considerable albumin and was alkaline. The fluid increased after meals. The ingestion of HCl caused the fluid to increase; alkalies and fats had no considerable influence. The author considers that active trypsin was never present as such; that tryptic activity was observed only when intestinal secretion was also present; the greatest amount of trypsin was then found about 4 hours after meals; the same was true of the fat-splitting and the diastatic ferment. The diastatic ferment, the author states, did not produce glucose from starch, its action ending with the production of maltose. The final production of glucose was due to the intestinal juice. Lactose was not affected by the diastatic ferment. This is considered to be the first study of pure pancreatic juice in a normal human being. Fränkel mentioned, as of clinical interest in the case, that the presence of an

¹ Deut. med. Woch., Oct. 9 and 16, 1902.

² Zent. f. innere Med., April 4, 1903, p. 360.

enormously enlarged gallbladder and of marked cachexia had led to a diagnosis of malignant obstruction, but operation showed that the obstruction was due to scar-tissue, and was in the duodenum at the papilla.

F. P. Kinnicutt¹ discusses **pancreatic lithiasis** and reports a case. He states that this case is only the seventh recorded in which the diagnosis was positively made or in which the condition was suspected during life. This patient had attacks of pain similar to those of gallstone colic. The calculi, however, were of curious appearance. They were examined chemically, and found to consist of calcium carbonate and phosphate, without cholesterol or bile-pigment. This observation was repeatedly made. Jaundice did not accompany the attacks. The urine contained no glucose at any time. In several recent attacks jaundice was observed, however, and calculi were recovered from the stools. These were found to consist chiefly of cholesterol. It was, therefore, decided that in the earlier attacks the patient had had pancreatic colic, and in the later attacks gallstone colic. The digestion of fats was investigated, when the stools showed that there was a free flow of bile into the bowel. It was found that over **42 % of the fat of the feces was neutral fat**, while the absorption was entirely normal. It was believed that this indicated a diminished flow of pancreatic secretion into the intestine. It was also believed that pancreatic lithiasis had predisposed to cholelithiasis. The study of the symptomatology of this condition shows that there is in it nothing absolutely characteristic of pancreatic lithiasis. Even the pain is usually like that of cholelithiasis. Ptyalism is not an important or a characteristic symptom. Calculi are not often found. While the individual symptoms are not characteristic, a combination of attacks of colic, with or without jaundice, with a large number of muscle-fibers in the stools, accompanied or followed by glycosuria, furnishes reasonable grounds for a diagnosis of pancreatic lithiasis. Deficient splitting of the fats of the food may prove to be an important sign also.

C. Roosen-Runge² gives a brief discussion of the literature concerning the **relation of trauma to fat necrosis**, and reports at length 4 cases of fat necrosis that have previously been briefly cited by Simmonds. The author considers that trauma undoubtedly plays a rôle in the etiology of fat necrosis; and thinks that in medicolegal work, if a trauma has occurred and at necropsy there is found widespread fat necrosis, the possibility must be considered that the trauma produced death.

DISEASES OF THE PERITONEUM.

P. Hilbert³ reports an interesting case of **perforation peritonitis**, the chief points of importance being that the patient had a marked ascites, and had been tapped by the previous attendant. Soon after this tapping there were evidences of peritonitis, and the patient died rapidly of septic peritonitis. The fluid removed by tapping was very cloudy and con-

¹ Am. Jour. Med. Sci., Dec., 1902. ² Zeit. f. klin. Med., Bd. xlv, Hefte 5 u. 6.

³ Deut. med. Woch., July 24, 1902.

tained numerous pus-cells; and the necropsy showed that there were numerous small diverticula in the sigmoid flexure, and that one of these had perforated. It was believed that the perforation had occurred before the tapping; that there had been slight leaking, producing a mild grade of peritonitis; and that after the tapping the relief of the pressure caused a marked leakage into the peritoneal cavity and a rapidly fatal peritonitis. The case is important as showing how readily the attendant might have been accused of producing the fatal peritonitis.

R. Bernert¹ contributes a long article, with elaborate studies of 2 cases of **milky, nonfatty effusions**. In both cases these effusions occurred in the peritoneal cavity, and in both they were associated with malignant disease. Elaborate analyses of the fluid were undertaken in both instances. The chief conclusions reached were that the milky appearance of the fluid was due in both instances to the presence of a globulin, from which, by means of hot alcohol, large amounts of lecithin could be extracted. The author is inclined to the belief that the globulin had undergone a combination with lecithin, and had thereby become somewhat less soluble. There was very little fat present in the exudates, and their milky appearance was not at all due to fat. Bernert believes that the effusions were serous, and not chylous. This was indicated particularly by the small amount of fat present, and also by the amount and character of the dry residue, the amount of chlorids, of sulfates, and of alkaline earths. It is also an interesting fact that the fat present had the characteristics of degeneration fat, rather than of normal chylous fat.

T. Christen² refers to Mosse's recent report concerning milky ascites and to his view that lecithin had caused the milkiness of the fluid. Mosse stated that a milky ascitic fluid examined by him contained 0.2 gram of lecithin per liter; he also found that 0.08 gram of lecithin would suffice to make a liter of water distinctly milky. Christen, however, considers it quite possible that ascitic fluid contains substances that make lecithin more soluble in such fluid than in water; and he also states that Mosse's figures really indicate that the ascitic fluid that he examined contained only 0.02 gram of lecithin per liter, and not 0.2 gram. Christen has himself examined 3 ascitic fluids; one milky, and the other two not milky. In the milky fluid he found 0.077 gram of lecithin per liter; in one of the others, 0.316 gram; and in the third, none. He believes that this indicates that **lecithin does not of itself produce the cloudiness** of these fluids.

P. P. Comey and W. W. McKibben³ report a case of chylous ascites in a patient of 61 years, who, in March, 1902, had had signs of general infection, with swelling of the right leg and of the lower part of the abdomen. This looked like a cellulitis, but was finally thought to be a phlebitis. Later, he had an attack of acute circulatory failure. About 3 months after the first attack, the right leg still remaining swollen, he

¹ Arch. f. exper. Path. u. Pharm., Bd. xlix, Heft 1.

² Zent. f. innere Med., Feb. 14, 1903.

³ Boston M. and S. Jour., Jan. 29, 1903.

had a similar attack, which extended somewhat to the left leg, and also involved the shoulder, and part of the arm. A third attack occurred later. He then began to exhibit ascites. This increased, and the patient was tapped. The fluid was found to be pure chyle. The necropsy showed chylous ascites. There was no malignant disease. The renal and peritoneal lymph-spaces were much enlarged. The spleen was normal. The liver was slightly enlarged and hardened, and contained many granules the size of a pinhead. The thoracic duct was much enlarged and indurated. This was found to be due to a chronic lymphangitis, which involved "about a foot and a half of the length of the duct," and caused practically **complete obliteration of its lumen** in all the 12 sections that were made.

R. Schorlemmer¹ reports a case of **retroperitoneal cyst** that occurred in a man of 52. The symptoms were chiefly gastric. Examination showed a cystic mass in the mesogastrium and hypogastrium. It was impossible to find any relation between it and any of the abdominal organs. Operation was performed. The cyst-fluid, which was over a liter in amount, was emptied; the wound was closed; and the man entirely recovered. Examination of the cyst-wall showed an absence of both epithelium and endothelium. The fluid coagulated rapidly and spontaneously, and cleared upon being shaken with ether. It contained 0.4 % of albumin and 0.46 % of nitrogen. It had, therefore, the characteristics of a chylous fluid. It could not be determined at the operation that the cyst had any relation with the pancreas, the lymphatic system, the kidney, or the suprarenals; there was no appearance of carcinosis or of echinococcus; and the cyst was apparently not dermoid. Its nature could not, therefore, be definitely determined.

Mastri² reports a case in a man of 27, in which he made an erroneous diagnosis of malarial splenomegaly with malarial cachexia. The necropsy showed that it was a **growth in the retroperitoneal glands**. The spleen was much enlarged, probably as the result of compression of the splenic vein and of previous malaria. There was a furrow in the tumor that had given the impression of a typical notch of the spleen. The conditions in the case apparently demonstrate that it was impossible to have made a correct diagnosis.

DISEASES OF THE KIDNEYS.

METHODS OF EXAMINATION.

E. v. Kozeczkowsky³ has made a study of Ehrlich's **dimethylamido-benzaldehyd reaction** with the urine. He states that the reaction is very easily obtained and readily recognized. It has no special relation with any specific disease, as it is found in most severe infectious diseases. It is, however, of some importance to note that the reaction occurs with an increase in the intensity of the symptoms; while it disappears with

¹ Deut. med. Woch., Dec. 18, 1902.

² Gaz. degli Osped., No. 63, 1902.

³ Berl. klin. Woch., Nov. 3, 1902.

improvement. It is, therefore, of some prognostic value as an **indication of the severity of an intoxication**. The author also believes that its occurrence in a chronic enteritis is some evidence that this enteritis is due to tuberculosis.

G. Sticker¹ states that **bromin may be determined to be present**, even when any or all of the other halogens are present. Iodin may be removed previously, but this is not essential. The method consists in the removal of the iodin with sulfuric acid containing nitrous acid vapor, also adding some carbon disulfid. The bromin is then determined to be present by heating in a retort with chromic acid and sulfuric acid, holding a paper soaked with fluorescin at the opening. If bromin is present, the paper turns red. The author was unable to find bromin in the urine or saliva unless bromids had been previously used; in the latter case, he obtained distinct reactions in the saliva. He was unable to determine the presence of bromin in any organs examined, unless bromin-containing substances had been previously used. He has, however, **repeatedly found iodin in the urine**, when neither iodids nor food containing iodin had been previously given for days. He has also found iodin in human testicles and in cows' milk.

G. Klemperer² discusses the **measurement of the urinary pigment** and its diagnostic value. He describes his method, which consists in comparing with known strengths of dyes (using Echtgelb G, which is optically exactly the same as urochrome). He believes that with disease of the kidneys the excretion of pigment becomes reduced; and thinks that the less pigment a urine contains, when it is, at the same time, growing less in amount, the more severe is any disease of the kidneys. He considers this to be a matter of **importance in prognosis**, particularly in connection with heart-disease. A very dark urine indicates a better prognosis than does a light-colored urine.

UROBILINURIA.

M. Herscher,³ in a discussion of the **origin of urobilinuria**, leans to the view that urobilin is formed in the kidneys. He states that urobilinuria is by no means always accompanied by the presence of urobilin in the blood; although when urobilin is present in the urine, there is, as a rule, some bile-pigment in the blood. He believes that the kidneys transform bile-pigments into urobilin, the object being to rid the organism of the toxic bile-pigments. Urobilin is more diffusible, and therefore more readily eliminated. When cholemia is present but is of a mild grade, urobilin alone appears. This produces a so-called urobilin icterus, which the author believes to be really a bile-pigment icterus. If the cholemia is more marked, the urine will contain both bile-pigments and urobilin; while if the cholemia is extreme, the kidneys are overtaxed and cannot carry out any of their reducing action, and no urobilin appears in the urine. In occasional instances the liver, he believes, is active

¹ Zeit. f. klin. Med., Bd. xiv, Hefte 5 u. 6.

² Berl. klin. Woch., April 6, 1903.

³ Thèse de Paris, 1902.

in the production of urobilinuria; but he thinks that, as a rule, the urobilinuria is of **absolutely no value in determining the condition of the liver.** [The last statement is hardly true. The actual diagnostic value of urobilinuria cannot be stated, but it is certainly sufficient in many cases to suggest the presence of hepatic disorder.]

INDICANURIA.

J. Bouma¹ refers to the fact that in using his **isatin-hydrochloric acid method** for the determination of the indican of the urine as indigo-red, there is often observed a tinge of blue that makes it difficult to get an accurate result with the final colorimetric estimation. He has overcome this difficulty by carrying out the method as follows: Precipitate with lead acetate, pass H₂S through the filtrate, filter again, take 5.5 cc. of this filtrate, add 10 cc. of isatin-hydrochloric acid, boil, cool, and shake with 5 cc. of chloroform. The color is always pure red. The author believes that the oxidizing substances found in the urine, which interfere with obtaining a pure red color, are formed after the urine has passed the renal epithelium. He mentions a case of unilateral pyelitis in which the ureters were catheterized. It was found that the urine from the sound side gave a pure red reaction, while that from the other gave a reaction tinged with blue by the older method.

Porru-Costa² gives a general discussion of the **clinical importance of indicanuria;** and then states that besides the generally accepted view that it shows disturbance of the gastrointestinal tract, one must realize that it sometimes means changes in metabolic processes in the organism. He believes that indicanuria is an almost constant symptom of insufficiency of the liver, and that it is of importance in the diagnosis of this condition. In infectious lesions of the spleen, indicanuria is also an important symptom. [All of which means that indicanuria of itself means nothing more definite than that something is wrong. Each case must be studied for itself if one is to find out the nature of the disturbance. Indicanuria, in this sense, is still of importance.]

W. v. Moraczewski³ reports some observations, in 439 cases, concerning the relation between an increased **reaction for indican and the presence of calcium oxalate crystals** in the urine. He finds that when the indican reaction is excessive, oxalates are found in the urine in 84.3 % of the cases. When the indican reaction is extremely marked, oxalates are always present. When the indican reaction is increased, oxalates are absent in less than 11 % of cases. The contrary is also usually true. When oxalates are present, indican is usually found. The author believes that in most cases oxaluria and indicanuria are observed together; and he finds that a regulation of the diet, with the use of alkalies, causes both to decrease coincidentally. [It has been quite clearly shown in recent years that oxaluria is at times dependent upon digestive rather than metabolic disturbance.]

¹ Deut. med. Woch., Sept. 25, 1902. ² Gaz. degli Osped., 1902, No. 103.

³ Zent. f. innere Med., Jan. 3, 1903.

OXALURIA.

L. L. Bakhoven¹ has made a study of the excretion of oxalic acid and confirms the results of others that excretion is largely increased by the use of vegetable food rich in oxalic acid. After the use of such foods there is also an increase of the oxalic acid in the feces. Gelatin and gelatin-producing substances, and also large amounts of carbohydrates, cause an increase in the urinary oxalic acid. The author believes that the **chief source of oxalic acid** in the animal organism is the carbohydrate food. In the treatment he recommends the use of a diet poor in carbohydrate, from which those vegetables containing much oxalic acid have been entirely excluded.

PHOSPHATURIA.

A. Soetbeer² and A. Soetbeer and H. Krieger³ discuss the nature of phosphaturia, and attribute it to a **disturbance of the excretion of calcium from the colon**, probably in consequence of catarrh of the colon. As the result of this, the calcium is excreted in excessively large amount in the urine and in unduly small amount in the feces, the consequence being the precipitation of the excessive calcium phosphate in the urine, and also at times alkalinity of the urine. The figures that the authors give, from examining a case in a child and one in an adult, show a relative increase in the calcium of the urine, as compared with that of the feces; and a relative increase in the urinary calcium, as compared with the urinary phosphate. The feces of a normal subject, also, as compared with the feces of the case of phosphaturia, showed an excess of calcium. This was soluble in water; it was evidently, therefore, calcium excreted by the intestine. [This is not a satisfactory explanation of most of these cases, and it is doubtful whether in the authors' own cases the explanation is so simple. The conditions of precipitation of the urinary phosphates are very complex.]

MELANURIA.

O. Helman⁴ gives a preliminary report of some investigations concerning melanuria. He considers that **melanogen can be demonstrated to be present** in urine by the following method: First, the careful addition of chlorid of iron, which produces a black precipitate; secondly, dissolving this precipitate in sodium carbonate, which forms a black solution; and, thirdly, adding mineral acids, which will precipitate a black or brownish-black powder from this solution. The first and second of the tests mentioned are, of themselves, insufficient, as other substances may give the same reaction. As a rule, the presence of melanogen in human urine indicates that there are melanotic tumors; but this is not always the case, as it may be present in the condition

¹ Diss., Utrecht, 1902.

² Deut. Arch. f. klin. Med., Bd. lxxii.

³ Jahrb. f. Kinderheilk., Bd. lvi, p. 11.

⁴ Zent. f. innere Med., Oct. 11, 1902.

called ochronosis. Other tests applied to the urine are less satisfactory than the iron-chlorid test. The author finds that melanin of various kinds, injected subcutaneously, disappears rapidly, the organism reducing the substance. This reduction seems to take place chiefly in the liver. He mentions a number of other points in relation to melanotic tumors.

HEMOGLOBINURIA.

C. W. Ensor and J. O. W. Barrett¹ reported to the Royal Medical and Chirurgical Society a case of **paroxysmal hemoglobinuria of traumatic origin**, the subject being a lunatic who had a habit of beating his forehead with the palm of his hand, sometimes doing this with extreme violence. After violent paroxysms of this sort hemoglobinuria regularly followed; and the violence always preceded the hemoglobinuria. The authors believe that the violence caused extravasation of blood into the subcutaneous tissue, and that this was dissolved out by an autolysin. L. W. Sambon (in discussion) said that there was no evidence of bruising of the skin, and that the occurrence of hemolysis was a pure assumption. He was inclined to believe that the paroxysms of violence and the hemoglobinuria were due to the same cause. A. E. Garrod believed that the muscular exertion might have had some causal effect, as this is generally recognized to be a probable cause of some cases in man.

HEMATURIA.

Guisy² reports 3 cases of what he terms **hysteric hematuria**. Two of the patients were women and one a man. All had previously been in good health, but were of hysterical type; and in all the cases there repeatedly occurred marked hematuria after decided nervous excitement, although the examination of the urinary organs seemed to show normal conditions. The man and one woman had severe pain in the back with these attacks. The other woman occasionally had hemoptysis also after excitement, although her lungs were intact.

CHYLURIA.

R. Waldvogel and A. Bickel³ contribute some interesting observations on a case of chyluria, with numerous investigations of the urine and of the fat contained therein; and also of the **effects of various diets upon chyluria**. They note that the free ingestion of fat at the patient's own will, the fat being consumed in various portions at different times of the day, had no influence upon the amount excreted. Large quantities of fats with low melting-points, such as butter, may, however, largely increase the fat-excretion in the urine; while fats with high melting-points have not the slightest effect. Melting-point determinations of the fat in the urine showed that in all instances, whatever the

¹ Brit. Med. Jour., March 28, 1903.

² Deut. Arch. f. klin. Med., Bd. lxxiv, Hefte 5 u. 6.

³ Progrès méd., No. 18, 1902.

fat taken by mouth, the fat of the urine that is soluble solely in ether has a melting-point between 40° and 45° C.; while the portion soluble in water shows marked variations. The authors insist upon the possibility that chyluria is really not an actual mixture of chyle with urine. In the first place, the absence of many white blood-corpuscles and of sugar would indicate this; and, more important, the fat-content of the urine is so large that it cannot be explained through a mere mixture of the chyle with the urine, because in this mixture a marked dilution would take place. One possibility that is suggested is that the **chyle is emptied into the blood in abnormally large amount**, and then becomes altered in such a way that in some cases the albumin and fat are excreted; in others, the fibrin-forming elements also. The authors are, however, strongly inclined to the view of a number of authors that chyluria results from the presence in the blood of an abnormal amount of chyle-elements, and from the inability to assimilate all this abnormal quantity. The most important objection to this is that, so far, it has never been demonstrated that there is a very large excess of fat in the blood; but this question has not, as yet, been properly studied.

ALBUMOSURIA.

L. Napoleon Boston¹ reports a **rapid method of demonstrating Bence-Jones albumose** in the urine. It is a modification of the lead-test, and is carried out by adding a saturated solution of sodium chlorid in equal quantity, and then 2 cc. or 3 cc. of a 30 % solution of caustic soda; shaking vigorously; then boiling the upper portion of the column of liquid in the test-tube; and adding, drop by drop, a 10 % solution of lead acetate. When the lead solution comes in contact with the liquid, there is a marked cloud at the surface, which becomes less dense as the boiling-point is approached. When boiling has been prolonged for from one-half to one minute, the upper stratum becomes brownish, and then dull black. The reaction depends upon the presence of loosely combined sulfur, which is thought by many chemists to distinguish Bence-Jones albumose from other albumoses.

G. Jochmann and O. Schumm² give an extensive report of a case of the kind termed Kahler's disease in Germany (*i. e.*, multiple myeloma associated with Bence-Jones albumosuria). The case was **previously reported as one of osteomalacia** associated with Bence-Jones albumosuria, chiefly because of the marked involvement of the pelvis and of the long bones of the extremities. Now, after an elaborate study, the authors state that they believe that the case was not one of osteomalacia, but one of **very widespread myeloma**, involving not only the bones commonly affected in this condition, but also those usually involved in osteomalacia. They think that **x-ray examination might be very important in diagnosis**. In the first place, it would, as a rule, show the limitation of the disease to either the bones commonly affected in myeloma or to those

¹ Am. Jour. Med. Sci., Oct., 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

generally involved in osteomalacia; or, in rare cases like the present one, it would show an eating-out of the inner wall of the hollow bones, with curious marked projections and lacunas from the marrow and irregular, tooth-like projections inward between these, and, at the same time, a striking thickening of the compact substance and an extensive disappearance of the spongy substance that is scarcely ever seen in osteomalacia. Schumm contributes the results of a prolonged chemical study of the substance excreted by the kidneys. He agrees with Magnus-Levy that it is not an ordinary albumose, and that it stands midway between true albumins and the higher albumoses. He demonstrated the presence of an albumose-like substance in the blood in this case. It seemed, however, to be a deutoalbumose; hence, it could not be stated that it was the same substance that was excreted by the kidneys. It did not give the histon reactions; it was, therefore, certainly not identical with globin. Deutoalbumoses have previously been found in the blood in leukemia.

H. F. Vickery¹ reports a case of **albumosuria of the pernicious-anemia type** in a man presenting the general appearances of pernicious anemia. His urine was found to contain an abundant precipitate, which formed upon heating, but dissolved upon raising the urine to the boiling-point, and reappeared on cooling. The red cells were reduced to 1,120,000; the hemoglobin was 15 %; the lymphocytes, 43 %. No megaloblasts were found. There was no evidence of any disease of the bones. The patient died after passing from observation.

ALBUMINURIA.

L. Kuttner² contributes an extensive and interesting article on **minimal albuminuria and cyclic albuminuria**, devoting his attention chiefly to the latter condition. He discusses first the question as to whether a minute amount of albumin persistently present in the urine means that there is a lesion of the kidneys. It is unquestionable that experimental clinical lesions of the nervous system may produce albuminuria, and there are many instances of minimal albuminuria to be found in persons that have no other evidence of disease of the kidneys and that do not develop any evidence of it. The postmortem conditions in these cases are, however, but little known; and it is impossible, as yet, to state that persistent albuminuria, even of slight degree, may occur without at least a slight lesion of the kidney. It is extremely important to distinguish serum albuminuria from nucleoalbuminuria. The latter, when marked, and particularly when unassociated with the presence of mucus and of many epithelial cells, must be looked upon with suspicion, at any rate. When it is associated with marked desquamation of epithelium and with considerable mucus in the urine, and when, at the same time, there is an entire absence of morphologic elements indicating disease of the kidneys, it may be considered to be probably a **purely extrarenal nucleoalbuminuria**. As to cyclic albuminuria, the author states that

¹ Phila. Med. Jour., Aug. 2, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 5 u. 6.

during the last ten years he has observed a great many cases. He limits his remarks to 62 that he has studied with care. He attributes his more frequent observation of the condition to the fact that most of the persons studied by him were ambulatory cases. These cases are relatively little seen in hospital wards, because the condition is usually accompanied with such slight symptoms—if, indeed, there are any. His methodic investigation of 50 men, 50 women, and 50 children, without any consideration of the condition for which they were seen, showed one man to exhibit simple cyclic albuminuria; another man, a combination of cyclic and pure albuminuria; 2 women, cyclic albuminuria; one, a combination of this with pure albuminuria; 6 children, simple cyclic albuminuria; 2 children, a combination of cyclic and actual albuminuria; and one child, true albuminuria having a cyclic course. A **cyclic nucleoalbuminuria without serumalbumin** was seen in 6 cases; and in all the other cases except 8, nucleoalbumin was found, together with serum-albumin. All but 2 of the patients were less than 25 years of age. In 3 of them there was undoubtedly a chronic nephritis. This indicates how rarely definite signs of nephritis are found in the condition. In 29 of the cases casts were found at the time of the most marked albuminuria. There were many hyaline and a large number of epithelial casts, but 32 cases showed no casts upon repeated examination. Casts, however, do not necessarily indicate an actual renal lesion. A general study of these cases was undertaken by the author, to determine how far one is justified in believing that cyclic albuminuria means actual kidney disease. This question he does not answer positively; but he refers to cases in which the cyclic albuminuria became continuous, and to some interesting cases in which the cyclic albuminuria alternated with attacks of hemorrhagic nephritis or attacks of hemoglobinuria. The frequent evidence of such a relation to serious disease makes one **suspicious that a persistent lesion is present**; but Kuttner thinks that there is no definite proof that this is the case, and that neither is there any evidence that structural change is absent. He makes two groups of cases: one including instances of cyclic albuminuria in which the condition has followed a nephritis and is associated with a chronic nephritis; and a second, in which there is no means of explaining the origin or the persistence of the condition. The only method of determining the actual pathologic importance of the condition would be by careful postmortem study, and the opportunity to carry this out is rarely given. The condition, however, has not been sufficiently studied by clinicians. One of the most striking characteristics of cyclic albuminuria is the tendency for the albumin to appear in the morning after the patient has assumed the upright posture. The author has been able to show that the assumption of the horizontal or of the sitting posture soon causes a diminution in the excretion of albumin. The upright position and exercise are not capable of causing an albuminuria in these persons at all times of the day. Edel believed that the condition is dependent upon changes in the blood-pressure; but this, Kuttner thinks, cannot be true of more than a comparatively small proportion of the cases. He has often observed dislocation of the kidney,

which was perhaps associated with the condition. He has studied sphygmograms in many of these cases, without obtaining results that seemed to be of importance in indicating the pathogenesis of the condition. [This paper contains many valuable details that cannot be given in one abstract. Kuttner's warning about mistaking nucleoalbumin for serumalbumin is important. It is remarkable how frequently this mistake is made.]

Inouye¹ discusses **alimentary albuminuria**, first contributing some experimental observations in which he studied the specificity of the **serum-reaction for several kinds of albumin**. He reaches the conclusion that the reaction is not absolutely specific with urine, as sometimes a cloudiness occurs in urines when the animal is supposed to be practically normal and has not been treated in any way; and a slight reaction for egg-albumin is sometimes obtained when serumalbumin only is present. The reaction is, however, sufficiently accurate, the author thinks, to serve to identify albuminous bodies. He also contributes some observations on human subjects, his main purpose in making these having been to follow the idea, which he believes to be a correct one, that if alimentary albuminuria occurs, it **indicates that the renal filter is somewhat defective functionally**; though perhaps not diseased. If it can be determined that the kidneys allow albumin to pass them more readily than in health, this will be an indication of a lack of resistance on the part of these organs. The author has tested patients by giving them from 4 to 8 raw eggs on the empty stomach, examining the urine every 2 or 3 hours afterward. Of 22 persons with supposedly normal kidneys, positive results were obtained in 8. He believes that these cases constitute a further **demonstration of the possibility that alimentary albuminuria occurs**, and of the possibility of using his method in making a study of the functional capacity of the kidneys. He has also examined 5 cases of chronic nephritis by this method. In 4 instances, and particularly in 2, he found the excretion of albumin increased. He was not, however, able to determine definitely whether both egg-albumin and serumalbumin were excreted.

F. Engel² discusses the question of **traumatic albuminuria**, referring to the recent reports concerning this question, which have originated chiefly from surgeons. He himself reports the case of a man of 22 years, who had a fall, in which he struck upon his hands and then upon the lower posterior portion of the right thorax. The blow in the latter region was followed by mild symptoms of injury, but there were no definite signs of injury there. The urine contained a considerable quantity of albumin and traces of sugar. It was known that the patient's urine had been examined a short time previously and had been free from albumin. Microscopic examination after the injury showed no red blood-cells and no kidney-epithelium or casts. Ten days subsequently to the injury there was still a slight reaction for sugar. There had been some pain in the region of the kidney, and this was thought to have been

¹ Deut. Arch. f. klin. Med., Bd. lxxv, Hefte 3-5.

² Berl. klin. Woch., March 9, 1903.

due to contusion of that organ in the fall. Since there was no hematuria, it was thought that the albumin had been due to a nephritis set up by the injury.

H. Lüthje¹ reports some observations concerning the **effect of the salicylic preparations upon the genitourinary tract** that are of much importance in relation to the therapeutic use of these substances. In 33 cases investigated, the author found that in all instances the use of salicylic preparations **caused the appearance in the urine of pathologic elements**. Albumin was frequently present; great numbers of epithelial cells from all portions of the urinary tract were almost constantly observed; white blood-corpuscles were frequently found; and various forms of casts, and also cylindriforms, were constantly seen. The appearance of these substances was in direct relation to the use of the salicylates. The return to normal conditions was seen after the drug had been stopped; although the recovery took from 2 to 3 weeks. The author, therefore, states that after the use of ordinary therapeutic doses of salicylic preparations there occurs a **very marked irritation of the urinary tract**, particularly of the kidneys. He insists that it is important in suspected renal irritation of any kind to make it a regular custom to look, not only for albumin, but also for morphologic elements indicating irritation. **Casts were constantly found** in these cases, while **albumin was not always present**. Lüthje considers it essential to avoid the persistent use of any form of salicylic preparation. He then makes some observations concerning the origin of casts and cylindriforms. He states that in the urine from persons taking salicylates he was frequently able to observe intermediary stages exhibiting the formation of casts from altered renal epithelium. He contributes a number of illustrations exhibiting this process. He believes that **casts may be formed both from altered renal epithelium and from transuded albumin**. As to cylindriforms, he considers that they can certainly be formed above the bladder, as he has found them in urine collected directly from the ureter. They can almost certainly be formed in the kidney. He has also observed the formation of cylindriforms directly from the renal epithelium.

R. Pollatschek² has made a study of **albuminuria and cylindruria in erysipelas**, investigating 50 typical cases. He found in 7 cases a slight, evanescent albuminuria; in 3 cases a more prolonged albuminuria; in 6, albuminuria with casts; and in 3, pure cylindruria without albuminuria. In the latter cases the number of casts was small. The author believes, therefore, that signs of irritation of the kidneys occur in about 38 % of cases of erysipelas. These signs may consist in the presence of casts without albumin, of albumin without casts, or of both albumin and casts. Even severe albuminuria and marked cylindruria may be very transitory, and a grave prognosis cannot properly be established by their presence.

¹ Deut. Arch. f. klin. Med., Bd. Ixxiv, Hefte 1 u. 2.

² Zent. f. innere Med., May 16, 1903.

NEPHRITIS.

C. B. Sylvester¹ reports a case of **mumps** in a student 17 years of age. The parotid swelling suddenly subsided within 24 hours, but was succeeded by renal tenderness, suppression of urine, delirium, and apparently beginning convulsions. After the renal secretion had been reestablished, the nervous symptoms grew less and soon disappeared. The attack was followed, a few days later, by orchitis.

A. R. Elliott,² in discussing the etiology of chronic nephritis, states that he believes that the most common cause of primary contracting kidney is **auto intoxication of digestive origin**.

L. Weber³ reports 3 cases that, he believes, indicate the **importance of chronic gastrointestinal disturbance** in the etiology of chronic nephritis.

Waldvogel⁴ discusses the question concerning the existence of an **acute syphilitic nephritis**, and refers to the fact that, in order to prove the existence of such a condition, it must be shown that the patient has not previously had any disease that is frequently complicated with a nephritis; that the nephritis is associated with a recent outbreak of a florid syphilis that is still present at the time of the appearance of the nephritis; and, finally, that the use of mercury causes a rapid disappearance of the nephritis, other treatment not being used. He then reports a case in a man of 31, who, about 3 weeks before his admission to the hospital, had begun to exhibit edema. This had increased rapidly, and had become associated with marked dyspnea and other symptoms. Upon his admission, he showed the signs of a severe, acute nephritis. His history showed the absence of any previous diseases except measles and pneumonia. Since passing through these, he had been entirely well. He was not alcoholic. The use of inundations of mercury caused a **rapid and complete disappearance of the nephritis**. It is possible that this was merely a coincident appearance of acute nephritis and syphilis, but the effect of mercury and the absence of any other cause of nephritis made this seem very improbable. The signs of nephritis disappeared much more completely and quickly than the other signs of syphilis. The author believes that iodids are much less useful than mercury in the treatment of nephritis in syphilis. [We have recently observed a case of acute nephritis that had all these characteristics of syphilitic nephritis.]

H. Senator,⁵ discussing the various theories concerning the **cause of the cardiac hypertrophy** in disease of the kidney, refers to the fact that these theories are all unsatisfactory in relation to many details. He then mentions Strauss's work, which demonstrated an increase of the molecular concentration of the blood in chronic contracted kidney, while the molecular concentration is normal in chronic parenchymatous nephritis. The albumin and the specific gravity of the blood are de-

¹ Amer. Med., Aug. 23, 1902.

² Jour. Am. Med. Assoc., Oct. 4, 1902.

³ N. Y. Med. Jour., Jan. 17, 1903.

⁴ Deut. med. Woch., Oct. 30, 1902.

⁵ Deut. med. Woch., Jan. 1, 1903.

creased in the latter disease and normal in contracted kidney, and the nonproteid nitrogen is increased in contracted kidney and about normal in chronic parenchymatous nephritis. The author believes that this indicates that the **cardiac hypertrophy is the result of chemical changes** and of the presence of irritating substances. In acute nephritis and in chronic parenchymatous nephritis, especially in the former, the irritation is most severe; and the result is to damage the vessels so as to cause dropsy. In acute nephritis there is no time to produce cardiac hypertrophy; but in chronic parenchymatous nephritis the abnormal condition of the blood acts as an irritant upon the entire heart, and there is, therefore, likely to be hypertrophy of the heart if the course of the disease is sufficiently long. There is, in addition, a contraction of the bloodvessels that tends to make the left ventricle hypertrophy to an especial degree. In chronic interstitial nephritis the collection of irritating substances in the blood goes on much more slowly. It does not cause such rapid damage of the bloodvessel walls; there is, therefore, only slight tendency to dropsy, but an increasing tendency to the accumulation of excretory products. This causes hypertrophy of all the portions of the heart and contraction and thickening in the arterial walls. The latter causes, again, an especial tendency to hypertrophy of the left ventricle.

H. B. Allyn¹ discusses **pericarditis as a terminal infection** in chronic Bright's disease, referring to the general literature upon terminal infections and reporting a case of pericarditis due to a terminal infection in chronic nephritis.

DIAGNOSIS.

H. Senator,² in a general discussion of modern methods of diagnosing diseases of the kidneys and the functional capacity of these organs, refers emphatically to his teaching that the **leukocytes found in Bright's disease are of the mononuclear variety**, while those in inflammations of the urinary passages from the pelvis down to the urethra are polymorphonuclear. He discusses the value of the various methods now in use for determining the functional capacity of the kidneys or the presence of disease.

O. Pielicke³ reports a case that is of importance in relation to the use of **phloridzin in the diagnosis of renal disease**. The patient whose case is reported had renal colic and was injected with 0.005 gram of phloridzin. He passed traces of sugar, and the urine was soon found to contain albumin, blood-corpuscles, and casts. It soon afterward exhibited a large amount of blood and a great many casts. The hematuria persisted for 3 weeks. After this, there was a gradual return to the previous condition, which was one of slight albuminuria, occasional red and white cells, and very few hyaline casts. [It is difficult to believe that a substance that produces so marked a disturbance as glycosuria

¹ Amer. Med., Oct. 18, 1902.

² Berl. klin. Woch., May 25 and June 1, 1903.

³ Zent. f. Harn- u. Sexualorgane, Bd. xii, Heft 10.

(as does phloridzin) can safely be used for diagnostic purposes; particularly when the value of a positive result is still questionable.]

A. Landau¹ has made a study of the **value of methylene-blue in determining the functioning power** of the kidneys; and, in common with most other observers who have given the subject careful attention, reaches the conclusion that this test has no diagnostic importance. It offers a little aid in determining the functioning power of the kidney, but the errors are so great that they make the **results almost wholly unsatisfactory**. This is undoubtedly to be expected, since methylene-blue is a substance foreign to human metabolism and cannot well indicate the activity of the kidneys in excreting the substances which normally pass through them. Furthermore, in its passage through the body chromogen is produced; hence, the excretion of chromogen would indicate quite as much the activity of the tissues in producing it as the activity of the kidneys in excreting it.

H. Strauss² gives a comprehensive discussion of the standing of **urinary cryoscopy** in the diagnosis of bilateral disease of the kidney. He shows that the procedure is **not at all to be depended upon**, as usually carried out; because the differences in the amounts of various kinds of food ingested, the time of day, and temporary peculiarities of metabolism, so largely influence the excretion that the results are extremely irregular, even in the same individual and under the same circumstances. He has made a study of a series of cases by a new method of his own, allowing the patient to take only 500 cc. of some form of milk-soup, without salt, at 6 o'clock in the evening; and having him pass urine at 10 P. M., at 5 o'clock the following morning, and again at 6 A. M. At this hour he administers, on different days, a test consisting, in one case, of 500 cc. of pure water; in another case, of this amount of water containing 10 grams of sodium chlorid; and in a third, of that quantity of water and 50 grams of gluton. From 6 to 11 o'clock on each of the mornings the urine is collected every hour, and the amount, the freezing-point, and the sodium-chlorid content are determined. The author believes that of the 3 tests, the one with plain water gives the most satisfactory results. He was able to draw some conclusions from his studies, although the method has not yet been investigated in a sufficient number of cases to make it evident whether it has any distinct value or not. He believes that his work has demonstrated that the polyuria in chronic nephritis, chiefly of the interstitial variety, is a compensatory symptom intended to increase the excretion of retained metabolic products. The results also indicate the same concerning the edema of nephritis.

D. S. Grim³ discusses the **general principles of cryoscopy** with reference to its use in diseases of the kidneys and uremia. He states that he has made investigations of over 400 pathologic urines and of a large number of normal urines; and has come to the conclusion that cryoscopy cannot replace other methods of investigation, but can only

¹ Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

² Zeit. f. klin. Med., Bd. xlvii, Hefte 5 u. 6.

³ Phila. Med. Jour., March 21, 1903.

supplement them. It is, however, probably the most delicate test known for detecting and estimating the effects of therapeutic measures directed toward cardiac and renal lesions. It permits of reasonable accuracy in diagnosing renal insufficiency and determining the type of renal lesion present. The examination should be prolonged over a number of days. Uremia cannot be diagnosed from an examination of the urine alone. Cryosecopic of the urine from each kidney, especially when supplemented by the phloridzin and the methylene-blue tests, becomes a very reliable and delicate method of detecting the presence of unilateral kidney-lesions and the degree of insufficiency of the affected kidney.

O. Rössler¹ describes a method of **volumetric estimation of the albumin in urine**, devised by him for Kussmaul, and said to have been constantly used by that clinician. A solution is made of 2 parts succinic acid, one part corrosive sublimate, $\frac{1}{10}$ part sodium chlorid, and 50 parts distilled water. Three drops of this is added to 5 cc. of dilute acetic acid in a test-tube, test-tubes of the same diameter being always used. Then urine is carefully allowed to flow from the filter onto the top of this mixture, and the height of the column of coagulated albumin formed at the juncture is carefully read off by means of a compass or other accurate instrument. Kussmaul considered this method to permit of the clinical determination of slight changes in the amount of albumin; and he **used it in obscure cases of albuminuria** to determine whether an albuminuria was due solely to disease of the lower urinary tract or was associated with disease of the kidney. This was done by estimating the albumin at the same hour on a day of rest, on a day when the patient had exercised on the level, and on a day when he had been climbing a mountain. If disease of the kidney was present, the albumin was practically always moderately increased after exercise on the level; and the amount was decidedly larger after mountain-climbing.

UREMIA.

A. Bickel,² in a study of the **freezing-point and the electric conductivity** of the urine and blood in a case of uremia, finds that, as in his previous work in animals after bilateral extirpation of the kidneys, there is a marked increase in the total molecular concentration of the blood-serum, which is not necessarily produced by an abnormal increase in dissolved electrolytes.

H. Hedlinger³ contributes an interesting study of some clinical questions related to hemolysis, particularly referring to the peculiar observation of Neisser and Döring that in a uremic case the blood-serum had active hemolytic power; but when the serum had been inactivated and it was attempted to reactivate it by adding fresh serum, the hemolytic power was not reproduced. The author reports a case of uremia in which a similar observation was made, another in which the test was negative, and a third in which the test was positive. In the latter case

¹ Deut. med. Woch., May 7, 1903.

² Deut. med. Woch., July 10, 1902

³ Deut. Arch. f. klin. Med., Bd. lxxiv, Hefte 1 u. 2.

the "**uremic hemolytic reaction**" appeared at a time when vomiting was the sole symptom of uremia. The second case was possibly not uremia; at any rate, it was not associated with the cardiovascular changes that occur in chronic nephritis, and the case was one of pyelonephritis—not of general diffuse nephritis. In a fourth case hemolysis did not occur with unchanged serum, nor with the combination of inactivated and active serum. In none of the cases except the second was the hemolytic action of the serum normal. The reason for these alterations in hemolysis is difficult to give. It is, of course, possible that physico-chemical changes play an important role; but this is not the sole explanation, as uremic blood at times does not show an increase in molecular concentration. Strauss and Wolff are inclined to consider that the hemolysis in serous fluids is directly dependent upon the amount of albuminous bodies. The author has, however, reached directly the contrary view, as the result of his work on exudates and transudates. His final conclusion concerning this hemolytic reaction in relation to practical diagnosis is that the matter is of little importance clinically. Investigations are difficult to carry out; and the test is of little value when positive, unless it happens to be obtained in a case in which there are, as yet, no important signs of uremia. This will certainly occur very rarely. Hedinger makes the interesting statement, however, that it is possible that, by a method such as this, we **may be able to make distinctions between different classes of cases**, which we now, in our ignorance of the actual nature of uremia, group under one head; but which are probably very different in their etiology and in many of their characteristics. [Could the latter be done, it would be extremely gratifying. We undoubtedly group a mass of heterogeneous cases under the term uremia.]

E. Neisser and U. Friedmann,¹ in referring to the peculiar hemolytic reaction previously observed by Neisser and Döring, state that, in the first place, they have determined that the **amboceptor of human serum is to some extent thermolabile** at a temperature of 56° C. Working upon this basis, they present a new explanation for the previously described reaction in uremia. In normal serum the amboceptor is not affected by a temperature of 51° C. They found, however, that in a case of uremia a temperature of 51° during uremic symptoms destroyed a large proportion of the amboceptors. In the interval, when the patient was free from symptoms, this temperature did not damage the amboceptors. The authors believe that they were incorrect in stating that the reaction is due to the presence of an anticomplement, and consider that it is the **result of the production of an amboceptoroid in uremia**. Analogous conditions were found in pneumonia cases, though these were much less marked. The change in the amboceptor consists in a destruction of the cytophile group on heating to 56° C. This they believe to be a specific peculiarity of uremic serum. Whether it is due to the appearance of abnormal amboceptors, or to the production in uremia of substances that react with the cytophile group of the normal amboceptors, the authors could not determine.

¹ Berl. klin. Woch., July 21, 1902.

D. Riesman¹ gives a general discussion of **uremic aphasia**, reporting one case in which this was associated with hemiplegia, and another case in which it was the sole evidence of paralysis. He states that aphasia is at times the sole expression of uremia; that it may be a precursor of convulsions or coma; or that it may be comparatively slight and rapidly pass off, although in chronic cases it has a marked tendency to recur. When there is associated paralysis, the aphasia usually disappears first. It is generally of a motor type, but is at times sensory. It is frequently associated with other paralyses. The characteristics of the aphasia itself are not distinctive of uremia, the most important diagnostic features being the fact that the aphasia is transitory and that there are other signs of uremia or of nephritis. The cases in the literature are given in tabular form.

Treatment.—C. v. Rzetskowski² contributes an interesting article concerning **metabolism in chronic nephritis**. The most important result of his extended study was to show that the patient had a marked nitrogen-retention; while, at the same time, he had no edema, and was improving decidedly in general condition. The author considers that results of this kind demonstrate that there has been **too much fear of nitrogen-retention in chronic nephritis**; and that under such circumstances as these (when the nitrogen-retention is associated with improvement in general health) it means that the patient is actually improving and building up tissue, and not that his excretory powers are growing more imperfect. The practical conclusion from this is that in chronic nephritis we **must attempt to cause a nitrogen-retention**, so long as this is not associated with unfavorable symptoms; for these patients have usually suffered a previous nitrogen-loss from the disease itself. It is difficult to keep a patient in metabolic equilibrium with a milk diet, because milk in sufficient quantity constitutes so large a bulk as to be a great strain upon the heart and vessels; and, besides, the patient readily grows extremely tired of milk. The author insists, therefore, that a **strictly milk diet is an irrational treatment**, and that the diet should contain a fairly free ration of readily digested carbohydrates and fats; but that a moderate quantity of nitrogenous food should also be given. The chief point in the diet should be to **avoid substances that are distinct irritants** to the kidney. The patients should not be allowed to take too much mineral salts (this includes ordinary table-salt); they should not take salt meats, and should not eat substances that are freely spiced or that contain spicy principles; they should avoid, also, meat-extracts, and the like. Meat may best be given boiled, because this removes much of the extractives. Fluid should be given only in moderate quantities, because of the danger of overtaxing the circulation.

C. von Noorden,³ discussing the **dietetic treatment of granular kidney**, states that in determining whether a diet is suitable for the individual case one must observe, first, the general condition of the patient; secondly, the intensity of the albuminuria; and, thirdly, the ex-

¹ Jour. Am. Med. Assoc., Oct. 11, 1902.

² Zeit. f. klin. Med., Bd. xlvi, Hefte 1-4.

³ Brit. Med. Jour., Nov. 1, 1902.

cretory power of the diseased kidneys. One should exclude, as far as possible, all articles of diet the metabolic products of which are excreted by the diseased kidneys imperfectly and with difficulty. The phloridzin-test and cryoscopy are of some value, particularly cryoscopy in comparing the secretory powers of the two kidneys, but the elimination of foreign bodies is not a really good method of testing the general excretory power of the kidneys. As to the **substances that are imperfectly eliminated** in disease of the kidneys, the author mentions urea, kreatinin, hippuric acid, pigments, phosphates, inorganic sulfates, potassium salts, and sometimes water. Those that are well eliminated are uric acid, xanthin bases, aromatic substances, ammonium salts, amido-acids, chlorides, carbonates, and sometimes water. In acute nephritis elimination is unsatisfactory, and this is also the case in acute exacerbations of chronic nephritis and in the terminal stage. In other instances in chronic Bright's disease the elimination of the normal products of metabolism is usually good, but the kidney does it only with much more difficulty than in health. A case of Bright's disease **should not be required to eliminate more than about 30 grams of urea a day**, and the other substances mentioned as eliminable with difficulty should be kept low in amount. Foreign substances, such as iron, arsenic, alkaloids, and many other drugs, should be used with great care, if at all. Von Noorden insists strongly, however, that it is essential that patients with chronic Bright's disease should be allowed a **fairly generous amount of nitrogenous food**, the amount being kept down to about the quantity indicated by 30 grams of urea per day. Nuclein foods should be given only in very small quantities, if at all. The author has found that the elimination of the various kinds of albumin found in meat, fish, eggs, milk, etc., is about the same; and that, consequently, one does not need to be especially careful as to the nature of the animal or vegetable nitrogenous food given to chronic Bright's cases. **White and red meat, also, are equally valuable**; and the latter is not more harmful and does not contain more extractives. He states positively that the **free use of fluids is dangerous** for chronic Bright's disease cases, as it overtaxes the circulation; and he does not permit more than 1.5 liters (about 3 pints) of water per day. This reduction in the fluids may at first cause a slight relative increase in the albuminuria, but this increase will soon disappear. Sometimes reduction of the amount of fluids does seem to do harm. In such cases the fluid should be increased; but von Noorden has found that unless the fluids are reduced below 1.25 liters per diem, elimination rarely suffers. Obesity is a bad complication of Bright's disease, and should be guarded against by diet. [These papers are undoubtedly of great practical interest, and, based as they are on exact observations, they carry great weight.]

Donzello¹ has, by animal experiments, determined that the **diuretic effect of urophenin and diuretin** lasts only for a short time; and that if these drugs are given longer, the amount of urine is actually decreased. This he considers to be due to an actual **exhaustion of the renal epithel-**

¹ Rif. med., 1902, Nos. 213 and 214.

lium. If the use of the drug is stopped after it has been given for a short time, this exhaustion disappears; and renewed administration causes renewed diuresis. The author describes some histologic changes in the renal epithelium that he believes to be due to this exhaustion. He thinks that the prolonged use of diuretics may be the cause not only of oliguria, but also of uremia; as it interferes with the proper excretion of toxic products of metabolism.

Minkowski¹ has investigated the **diuretic effect of theocin**, a purin-compound. He finds that in some cases it is a very active diuretic. This diuretic effect was observed in all the cases except 2, in which it produced vomiting. The intensity of its action was decidedly varied. It was most active when there was marked edema, but the effect was not reliable. After its prolonged use the diuretic effect became constantly less marked. The dose used was about 4 grains 3 times a day. The heart-action and the blood-pressure did not seem to be unfavorably influenced by the drug, but it had a tendency to upset the digestive tract and to produce nervous excitement. It did not seem to damage the kidneys. [We have had some excellent results with this drug. We have found, however, as did Minkowski, that it is valueless in some cases for reasons that cannot be explained, and it is effectual for a short time only.]

Hess² discusses the clinical value of **agurin**, a combination of sodium-theobromin and sodium-acetate. The substance is intended to take the place of diuretin, being considered to have a less unfavorable effect than the latter. The author found that its diuretic action is about the same as that of diuretin, but that its use is less frequently accompanied by disturbance of the digestive organs. He recommends it as an improvement upon diuretin. Reye³ also recommends agurin for its **lack of disturbing effects upon the digestive organs**, and also because of its useful diuretic effect in heart cases. He has also seen good effects in chronic interstitial nephritis. Von Kelty⁴ has used agurin in 34 cases, and considers it to have no irritative effects upon the stomach or the kidneys and to have a useful diuretic influence in heart-disease. It has no marked diuretic influence in kidney disease, except in contracted kidney. A. Holle⁵ finds that agurin is a useful diuretic in heart-disease and in interstitial nephritis. In advanced nephritis no definite effect has been noted by him. The dose is from 15 to 45 grains per diem.

Rosenthal⁶ discusses the use of **helmitol**, a combination of anhydro-methylcitronic acid with urotropin. The drug is given in doses of from 15 to 25 grains 3 or 4 times a day. It has a pleasant taste, does not disturb the stomach or kidneys, and is considered by the author to be superior to urotropin as a **urinary disinfectant**. E. Heuss⁷ makes a similar report.

W. H. Thomson,⁸ in a general discussion of the **treatment of uremia**,

¹ Therap. d. Gegenwart, Nov., 1902.

² Therap. d. Gegenwart, 1902, No. 6.

³ Die Heilk., 1902, No. 6.

⁴ Die Heilk., 1902, No. 8.

⁵ Inaug. Diss., Munich, 1902.

⁶ Therap. d. Gegenwart, Dec., 1902.

⁷ Monatsh. f. prakt. Dermatol., Bd. xxxvi, No. 3.

⁸ Med. Rec., May 16, 1903.

states that he has at times found aconite in full doses to produce excellent results when other vasodilators have failed. Venesection is the best vasodilator; if this is objected to, the author recommends veratrum viride. The most certain diuretic he considers to be the **rectal douche of normal saline solution** at 115° C., and the best instrument for this purpose is Kemp's rectal irrigator. He also recommends the introduction of small amounts of normal saline solution hypodermatically, in the flank, in acute nephritis. He states that thoroughly oiling the skin before the diaphoretic measures are employed makes these measures more effective, by aiding in opening the ducts of the sweat-glands.

H. Stern,¹ in a general discussion of the treatment of uremia, refers to **hypodermoclysis and infusion**, and mentions the common belief that a hypotonic sodium-chlorid solution is better than one that is blood-isotonic. He has even found the results from a 0.5 % solution to be extremely valuable, and a 0.6 % solution is better than more concentrated solutions. This, he considers, is on account of the fact that the high osmotic tension of uremic serum is not so largely due to its ionized molecules as to its neutral molecules; and to effect a more general ionization and conductivity, water only is essential.

W. Ercklentz² presents an interesting statement of the **effects of hypodermoclysis with salt-solution** in experimental and clinical pathologic conditions. He gives an extensive review of literature, and then contributes some personal experiments on animals infected with *Staphylococcus pyogenes aureus*, and on others poisoned with anilin, strychnine, arsenic, ricin, cantharidin, and sodium chlorate. He found that the infusions had an unquestionable good effect in anilin-poisoning. With the other drugs there was a less marked influence, although he determined definitely that the salt-infusions cause a more rapid excretion of sodium chlorate. He decides, in general, that the possibility of favorably influencing poisoning by infusion of salt-solution **depends upon whether the poison combines firmly** with the tissues of the body or not. If it does, the effect will not be satisfactory. It also depends upon the possibility of producing diuresis. The effect will not be notable unless diuresis is produced; and if the poison causes some damage of the kidney,—as, for instance, arsenic does,—the result will probably be unsatisfactory. The author reports a series of clinical cases, including septic endocarditis, puerperal sepsis, kidney disease with uremia, and severe anemia of the pernicious type, in which salt-infusions were used—in some with doubtful but in others with very satisfactory and suggestive results.

Klempner,³ in discussing the **treatment of renal calculus**, recommends that if the colic persists in spite of the usual treatment, the patient should be given 150 to 200 cc. of water every hour. If this does not succeed in causing the stone to be passed, one may try **glycerin in large doses**. The author has, however, never seen any effects from the glycerin. Other things being unsuccessful, he institutes **massage of the**

¹ Amer. Med., May 2, 1903. ² Zeit. f. klin. Med., Bd. xlvi, Hefte 3 u. 4.

³ Therap. d. Gegenwart, Dec., 1902.

ureter and vibratory massage of the renal region, in order to produce peristalsis, for the purpose of driving the calculus on. He believes that in this way he has frequently avoided operation. The indications for operation, he thinks, are only total anuria and the signs of acute septicemia.

G. Seiler¹ reports a case in which there were attacks of renal colic, and in which the patient exhibited **suppression of urine for 7½ days** with only mild signs of intoxication. A trocar was introduced in the region of the right kidney and some blood was withdrawn, after which the patient passed urine containing a trace of blood, began rapidly to pass more urine, and recovered entirely, except for some subsequent signs of renal calculus.

CYSTIC DEGENERATION OF THE KIDNEYS.

I. N. Danforth² reports a case of cystic degeneration of both kidneys, which is interesting because the diagnosis was readily suggested during life by the **presence of tumors in the region of each kidney**. The protuberance could be determined to contain fluid. The man was 36 years of age when seen, and had led an extremely active life. The condition of his kidneys had apparently not interfered at all with his general health. He had slight albuminuria, however, with a very low specific gravity. These conditions remained unchanged during 3 years of observation; after this, the signs of renal incompetence came on, and there was marked hematuria and severe albuminuria. The man died from the incompetence of the kidneys. The two kidneys are stated to have weighed as much as 13 pounds.

PARASITES.

NEMATODA.

Uncinariæ.—C. W. Stiles³ contributes a valuable summary of his monograph on **uncinariasis in the United States**, reviewing his work demonstrating a special form of uncinaria in this country. Infection with these parasites usually takes place by swallowing the worm in water or in food. There is a **notable relation to sandy soil**; and this, he believes, is probably due to the fact that when the embryo or larva leaves the feces and enters the ground, it stands a much greater chance of gaining access to surface wells when the soil is sandy than when it is clayey. In other ways, also, the opportunities for reaching a point from which infection can be produced are greater in a sandy soil. In the early stages of infection the principal symptom is the presence of ova or parasites in the stools. Afterward, there is anemia, which is often attributed to malaria; a waxy or yellowish color of the skin; marked cardiac symptoms; irregularly appearing edema, or "bloating"; pro-

¹ Jour. Am. Med. Assoc., Oct. 11, 1902.

² Amer. Med., July 5, 1902.

³ Brooklyn Med. Jour., Feb., 1903.

gressive emaciation; and general flabbiness. Miscarriage is common in infected women. Infected children are often backward in their studies. They are likely to have headache, disturbance of the bowel, ravenous appetite, and sometimes pica. There are sometimes curious markings on the tongue. At times there is an odd fish-like stare to the eye. The lethality of **uncinariasis** cannot be definitely determined. Many of the deaths attributed to this condition are undoubtedly due to the occurrence of a second disease, to which the person has become especially subject on account of the reduction in health produced by the **uncinariasis**. As to the frequency of the condition: cities, towns, and country districts with clayey soils are not frequently infected. In some rural districts in the South, however, it is, the author believes, the **most common disease of the white population**. He thinks that in **economic importance it rivals and perhaps exceeds malaria**. In discussing the management of the condition, Stiles insists upon the importance of educating the profession as to the nature of the disorder, and regulating the water-supply. The treatment may consist in giving a large dose of thymol (15 gr.) and repeating it 2 hours later; and following this by a purgative. This treatment should be repeated once a week until the stools show no eggs present. Male-fern may also be used. Uncinariasis is not common in the North, but it is an occasional cause of obscure anemia.

H. F. Harris¹ describes the case of a man of 29 who had ankylostomiasis and who also presented the **symptoms of pellagra**. It is questionable whether the latter symptoms were not due to the intestinal parasites. If the case was pellagra, it is the first of its kind reported in the United States.

G. H. Evans² reports a case of infection with *Uncinaria americana* that had apparently **occurred in the Philippines**, as the man had been in good health before going there, and had returned with the symptoms of **uncinariasis** and with the ova of these parasites in his stools. The nature of the parasite was confirmed by Stiles. The case is interesting as indicating that *Uncinaria americana* is probably indigenous to the Philippines; hence, both forms are probably found on both continents. The patient had **symptoms of sprue**, a condition that the author believes is not a disease-entity, but is a symptom-group. These symptoms disappeared with the disappearance of the **uncinaria**.

H. F. Harris³ discusses **uncinariasis**. He considers it the "most common of the serious diseases of the southern part of the United States." He had reported one case of infection with this parasite, and has encountered a series of others since, stating that in all **13 cases have been observed by him**, 11 occurring in Georgia and 1 each in Florida and Alabama. He believes that if all those that were suffering with anemia could have been examined, he would have found many more cases. He refers to the condition that is often called malarial anemia in the South. In almost all instances, he states, he has found malarial parasites absent

¹ Amer. Med., July 19, 1902. ² Jour. Am. Med. Assoc., April 11, 1903.

³ Amer. Med., Nov. 15, 1902.

in these persons; but the eggs of the ankylostoma were present in the feces.

A. B. Herrick¹ reports a case of severe anemia produced by *Uncinaria duodenalis*. The red corpuscles were reduced to 2,300,000; the hemoglobin, to 23 %. There was 21 % of eosinophiles. The patient was discharged in an improved condition, though an ovum of the parasite could still occasionally be found in the stools.

J. A. Capps² reports a **fatal case of uncinariasis** in a man of 52 years, who was a native of the United States, but who had **acquired the infection in Panama**. He had marked gastrointestinal disturbances with profound anemia. The gastric disturbance made it practically impossible to carry out satisfactory treatment, and the man died. Other cases have been reported in this country. As far as is known, however, this is the first instance in which the disease has originated in Panama; and its importance in relation to the constructing of the Panama Canal is emphasized by the author.

A. Agramonte³ discusses the **relation of Uncinaria to the anemias observed in Cuba**, and states that he has seen 16 cases in which this parasite had produced grave symptoms, the previous diagnosis having most commonly been malaria. These persons were engaged in occupations such as field laboring and working in brickyards and on railway construction, so that they had had evident opportunity for infection. The anemia was intense in all the cases reported. The spleen was enlarged in 9 cases. The chief symptoms were weakness, gastrointestinal disturbances, and anemia. The use of thymol caused the expulsion of many adult worms in all the cases.

V. Grünberger⁴ reports a case of **ankylostomiasis** in which a fair degree of recovery had been attained before the patient disappeared from observation, the infection having been overcome. He especially notes the fact that **Charcot-Leyden crystals were always absent**, and that the **eosinophiles were increased** to as high as 12.7 %.

Strongylus.—J. T. Moore⁵ reports a case of infection with *Strongylus intestinalis* observed in Galveston, Texas. The patient had **attacks of painful diarrhea**, and an examination of the stools showed many examples of the embryo of the parasite. Treatment with thymol was ineffectual, as far as the parasites were concerned; nothing except the embryo was ever found. An attempt was made to grow adult worms by keeping the thin stools in the incubator, but the author observed nothing more than filiform larvae.

Oxyuris.—Rammstedt⁶ reports a case of **acute appendicitis** that he believes to have been due to *Oxyuris vermicularis*; since, upon operation, the appendix was found distended with large numbers of that parasite, and there was no other evident cause of inflammation of the appendix. He agrees with Schiller that this parasite can cause appendicitis, and he thinks that in cases of appendicitis it is important to examine the

¹ Amer. Med., July 19, 1902.

² Jour. Am. Med. Assoc., Jan. 3, 1903.

³ Revista med. Cubana, Sept. 1, 1902.

⁴ Wien. med. Woch., Dec. 27, 1902.

⁵ Amer. Med., May 30, 1903.

⁶ Deut. med. Woch., Dec. 18, 1902.

stools for the worms. Anthelmintic treatment might, however, be very dangerous in an acute attack; and the question of operation should be decided without serious consideration of the presence or absence of parasites. There was a marked leukocytosis in this case, apparently not in proportion to the comparatively slight lesions found at the operation.

CESTODA.

Bothriocephalus.—W. Zinn,¹ because of the rarity of the condition in Berlin, reports an example of **fatal pernicious anemia** produced by *Bothriocephalus latus*. The patient was treated with *filix mas*; and large numbers of segments of the worms, together with 6 heads, were expelled. The patient was extremely anemic, however, and very weak, and he soon died. [See also Rosenqvist's article, under Pernicious Anemia.]

R. N. Willson² reports a case of bothriocephalus infection in a woman of 46, in which, after repeated attempts to get rid of the parasite by various methods of treatment, the patient passed from under observation. She afterward returned with two specimens of *Bothriocephalus latus*, which she stated that she had passed after taking some medicine administered by a worm specialist. The author also discusses the nature of primary and secondary pernicious anemia. He believes that pernicious anemia is a secondary anemia; and that in the case of intestinal parasites the anemia is due, not so much to a toxic substance produced by the parasite itself, as to the digestive disturbance set up by the parasite.

Dipylidium.—C. W. Stiles³ describes a case of infection with the double-pored dog-tapeworm (*Dipylidium caninum*) in an American child 16 months old. The characteristics of this form of tapeworm are described in detail.

TREMATODA.

P. Manson⁴ reports a case of bilharzia disease in which the **infection took place in the West Indies**. This is the first instance met with by the author in which the infection has originated in that region, but he believes that it must be quite common there. The man presented some symptoms of uncinariasis. An examination of the feces showed the ova of the bilharzia.

W. R. Kynsey⁵ refers to the occurrence of **Bilharzia hæmatobia in Cyprus**, reporting the case of a man of 22 who passed blood with the urine. He had always lived in Cyprus. He had passed blood constantly for 6 months, but always at the end of micturition. The urine showed large numbers of typical ova. The treatment consisted in complete rest, and in the use of boric acid and infusion of buchu. The ova disappeared from the urine, and the symptoms had also vanished when the case was last seen.

¹ Deut. med. Woch., April 9, 1903.

² Am. Jour. Med. Sci., Aug., 1902.

³ Amer. Med., Jan. 10, 1903.

⁴ Brit. Med. Jour., Dec. 20, 1902.

⁵ Brit. Med. Jour., Sept. 27, 1902.

INFUSORIA.

Trypanosoma.—J. E. Dutton¹ reports the first case in which a trypanosome was found in human blood. The most striking features exhibited by the case were a chronic course, general wasting and weakness, irregular rises of temperature of a relapsing type, local edemas, congested areas in the skin, enlargement of the spleen, and increased frequency in pulse and in respiration. The condition has been persistent; and the patient, an Englishman in the government employ, has been invalided home. Malarial parasites were always absent. This trypanosome is a minute, worm-like organism with fairly rapid motion, exhibiting a whip-like flagellum at one end and being conical at the other. The body is short and thick, and the substance granular. There is one vacuole near the posterior end. The leukocytes may be observed to take up the trypanosomes. Their length varies from 18 to 25 microns; their width, from 2 to 2.8 microns. The author also notes that he has found trypanosomes in a specimen of blood from a child 3 years old. The symptoms presented by the case described at length are similar to those seen in animals and known to be caused by trypanosomes. Dutton calls this parasite *Trypanosoma gambiense*, since it was observed in Gambia.

C. J. Baker² reports 3 cases of trypanosoma in men. The cases occurred in Uganda. The first patient had been bitten by leeches about a year previously. He had headache and fever. The fever disappeared within 5 days, and the parasites disappeared from the blood and were not subsequently found. The second patient had the same symptoms. He had no history of having been bitten by any fly or other creature. One trypanosome was found, but subsequent examination was entirely negative. He was well on the fifth day. The third patient exhibited similar symptoms, and had some enlargement of the spleen and slight edema of the skin of the abdomen. He had no recollection of having been bitten by flies. He also was well within a few days. The cases illustrate the fact that the trypanosome has a wide distribution. They occurred in a country supposed to be free from tsetse fly-disease among cattle; but recently flies that apparently belong to this group have been found there.

P. Manson³ reports a case of trypanosomiasis in a woman from the Congo, the case presenting much the same symptoms as one previously observed by him. The method of infection was probably from the bite of some insect. This was followed by fever, lasting about 3 months; and there was a constant tendency to repeated attacks of erythema. The fever and erythema tended to recur about once in 10 days. The woman had also had joint-pains. She presented no signs of visceal disease, although she was slightly anemic. When last heard from, she was in good general health, but still had these attacks of fever, being perfectly well after the fever had passed. The author believes it

¹ Brit. Med. Jour., Sept. 20, 1902. ² Brit. Med. Jour., May 30, 1903.

³ Brit. Med. Jour., March 28, 1903.

probable that the disease is transmitted by *Argas moubata*, a poisonous tick of bug-like habits. He gives a description of this tick.

Balantidium.—E. Ehrenrooth¹ discusses the pathogenicity of *Balantidium coli*, contributing a clinical and pathologic report of a case in which these parasites were present, and in which it was believed that they had produced lesions. He concludes that when this organism has once obtained a foothold in the intestinal tract, it is capable of there causing a condition that may become of marked gravity. Pathologic studies gave no ground for the belief that this organism can produce general toxic effects such as those caused by the bothriocephalus. Degenerative and inflammatory processes were absent, except in the digestive tract; but there the local changes were, the author believes, due to the balantidium. The case ran a clinical course that led to the diagnosis of carcinoma of the stomach.

¹ Zeit. f. klin. Med., Bd. xlix, Hefte 1-4.

PEDIATRICS.

By J. P. CROZER GRIFFITH, M.D., AND J. CLAXTON GITTINGS, M.D.,
OF PHILADELPHIA.

GENERAL SUMMARY.

OF the medical investigations made during the 12 months to which the literature of the YEAR-BOOK refers, many have a distinct bearing upon pediatrics, and some are confined almost entirely to this department. Among them we note especially the progress made in the study of the leukocytic cells of the different fluids of the body, inflammatory or otherwise, and their bearing upon diagnosis. The relative number of cells of each variety, as seen in the cerebrospinal fluid, in fluid drawn from the pleural cavity, and the like, has become a matter of growing importance. So, too, the variety of leukocytes characteristic of different diseases has received continued attention. Equally of value have been the exhaustive studies made upon the composition of different varieties of milk, particularly with reference to the presence or absence of certain ferments and allied bodies. We feel that these studies are in the right direction, and that what has been accomplished constitutes the first step toward an improved feeding of infants. It would certainly appear that it is not merely the question of different amounts, or even of distinct chemical differences, in the proteids of milk which influences its digestibility so much as the presence or absence of those other bodies hitherto little known or but little considered. The significance of splenic anemia occurring in infancy or in early childhood has also been carefully considered. The results, however, have not been as yet conclusive, and different observers entertain different views on the subject. Cryoscopic examination has been receiving much attention, and possibly much will in the future be learned from it, although as yet its bearing upon children's diseases does not appear to be of great importance. So, also, the study of blood-pressure under different conditions is a matter entirely in its incipiency, but one from which in all probability much will be learned in the future. The subject of the etiology and pathology of rickets and its relation to other somewhat similar affections has continued to receive the attention of investigators. Although we seem to be no further advanced than before in our understanding of the true nature and cause of rickets, yet the year has seen a still sharper differentiation of this condition from such affections as achondroplasia and osteogenesis imperfecta. The exciting cause of scarlatina has not yet been clearly demon-

strated. The apparent benefit attending the use of antistreptococcus serum and the frequent occurrence of the streptococcus in the throat of scarlet fever patients make it appear at least partially responsible for the symptoms of the disease. The revival of buttermilk in infant-feeding is well spoken of by competent observers. In its successful use much seems to depend on the quality of milk or cream used, as well as on the care in its preparation and on the other ingredients of the buttermilk mixture. This seems to consist of a high proteid content which is in a digestible form, and a low fat content which is partially replaced by sugar. It still remains to be proved whether this fat deficiency will not lead to rachitis and other nutritional disturbances when a buttermilk diet is persisted in. Finally, distinct progress has been made in the therapeutics of some of the hemorrhagic conditions in infancy, and childhood, and some of the newer remedies for controlling hemorrhage such as gelatin and suprarenal extract, have been applied in some cases with decidedly good results.

MILK AND INFANT-FEEDING.

Thomas S. Southworth¹ calls attention to the neglect of the **maternal secretion** and to the too hasty adoption of artificial feeding when this fails. The principal causes of disordered or diminished maternal secretion are: too little exercise and fresh air, anemia, constipation, or a lack of fluid food of the right kind. Of the latter, the most valuable are milk, thin cornmeal gruel, water, and cocoa. At least one quart of milk should be taken in 24 hours, and cocoa should displace tea and coffee. Beer has little nutritive value, and malt extracts are useful only when the fat percentage is too low. The remainder of the diet should consist of plain, nutritious food. Blaud's pill guarded with cascara is the most useful for anemia. If the proteids remain too high, daily exercise in the open air is indicated. If the amount of mother's milk is insufficient, mixed feeding should be resorted to.

John Lovett Morse² advises the use of **both breast and bottle** at each feeding in the method of **mixed feeding** in order to take advantage of the ferments of breast milk. P. Budin³ also thinks it best to give both the breast and bottle at each feeding in these cases.

Feer⁴ reports further observations on the average and maximal **size of meals** in breast-fed babies. Pfaundler's measurements of the gastric capacity are 20 to 30 cm. less than Feer's estimated average quantities for each meal. Further study of the question is therefore necessary. For practical purposes in estimating the food quantities, we compare the amount taken during one week with the body-weight in kilograms. The weekly consumption of food per kilo of body-weight rises from 1100 cm. in the second week to 1200 in the sixth or seventh week, and then falls gradually to 1000 cm. in the twentieth week. The quotient of energy rises from 110 calories in the second week to 120 calories in the sixth

¹ Jour. Am. Med. Assoc., Aug. 2, 1902.

³ Le Progrès méd., July 5, 1902.

² Ibid.

⁴ Jahrb. f. Kinderheilk., Bd. lvi, 1902.

or seventh week, and then falls gradually to 100 calories in the twentieth week. Feer designates as the quotient of growth the gain which one kilo of body-substance will make from a kilo of milk in a given week. The value of the milk can be best judged by the size of this quotient.

Axel Johannessen¹ discusses **infant mortality** in Norway, attributing the lower death-rate of that country, as compared with that of the rest of Europe, to the better hygienic conditions of the country people, who usually nurse their babies, and who have a plentiful supply of pure cow's milk.

Louis C. Ager² finds that there are three chief causes for Brooklyn's **infant mortality**: unsanitary tenements, unsanitary streets and lots, and lack of knowledge on the part of the mothers as to the proper hygiene for their infants and as to the importance of good milk. Education of the mothers is urgently needed.

J. Ross Snyder³ suggests the **personal inspection of dairies** by physicians. There can be no greater stimulus for dairymen to supply uncontaminated milk of good quality than the knowledge that what they give will be known and that their patronage will be governed somewhat by the quality of milk furnished.

Reed and Ward⁴ find that **infectious mammitis** in the cow may have no specific symptoms; hence they insist on the importance of streptococci in milk. Their presence must be regarded as a matter of danger.

Giordani's⁵ experiments with rabbits and goats to produce **ferruginous milk** show that (1) iron enters into milk, when given hypodermatically, where it is found in organic combination, and can be absorbed and assimilated; (2) the quantity of iron in the milk is doubled, and more than doubled, by increasing the quantity injected. The injections were well tolerated, and the animals suffered no harm.

Soluble Ferments in Milk.—L. M. Spolverini⁶ draws the following conclusions from an exhaustive study of the milk of women and various domestic animals: (1) The **trypsin** ferment is very active in the milk of cows, goats, and dogs, and is less active in woman's and asses' milk. (2) The **pepsin** ferment is also present in these varieties of milk, but is less active than in the former. (3) The **amylolytic** ferment is never found in cows' or goats' milk. It is occasionally present in asses' milk, and is always found in woman's and dog's milk, where it is highly active. (4) The **hydrating** ferment, which transforms salol into carbolic and salicylic acids, is always present in woman's and dog's milk. It is much less active in asses' milk, and is not found in cows' and goats' milk. (5) The fat-splitting ferment **lipase**, like the proteolytic ferment, is present and more or less active in all the milks examined. (6) **Oxydase** is very active in cows' and goats' milk, and scarcely noticeable in woman's and dogs' milk. (7) The **glycolytic** ferment is found and shows varying degrees of activity in the milk of all these animals. Milk must be considered not as a simple mixture of nutritious chemical substances, but

¹ Jahrb. f. Kinderheilk., Bd. lvi, 1902.

² Brooklyn Med. Jour., Feb., 1902.

³ Jour. Am. Med. Assoc., June 13, 1903.

⁴ Amer. Med., Feb. 14, 1903.

⁵ Rev. de Mal. de l'Enf., xx.

⁶ Rev. d'Hyg. et de Méd. Inf., vol. i, 1902.

as a liquid containing as well active biochemical elements. In the milk of omnivorous animals all the ferments studied are present, whereas some of them are absent from the milk of herbivorous animals. By suitably modifying the food of a mammal (for example, the goat) all the ferments contained in women's and dogs' milk can be made to appear. For this purpose it suffices to give the animal with her habitual food those ferments which are not present in her milk. For the most part these ferments must be classed as ferments of elimination; to a less degree they are specific ferments of secretion.

Klimmer¹ finds that **asses' milk** obtained in the ordinary way is more free from germs than cows' milk. Both asses' milk and cows' milk form an excellent nutrient medium for *Bacillus coli* and the typhoid bacillus.

Siebert² emphasizes the importance of supplying the normal physiologic stimulus to digestion, in the **diet of the sick infant**. The digestive glands require the stimulus of normal food; their activity may be increased by the systematic use of digestive ferments and the use of meat extracts and dextrinized starch.

Alexander McAlister³ thinks that the failure to rate **morbidity** second only to mortality in the estimation of **food values** in infant-feeding is fruitful of incalculable evils. The mere fact that the infant lives and is growing fat is deceptive and easily makes an increasing morbidity which fatally exposes the infant to the first attack of an acute malady. While every death cannot be laid to the charge of the food employed, yet it must be admitted that many an apparently thriving infant's death is really attributable to deeply rooted results of improper nutrition.

Maynard Ladd⁴ discusses at some length the **percentage modification of milk** in home modification for infant-feeding. He offers a printed card, of convenient pocket size, on which can be seen at a glance the proportion of ingredients to be used in a 20-oz. mixture of any desired strength. Larger amounts can be determined by a simple multiplication. The calculations are based on certain average formulas of milk and cream, which, of course, are subject to wide variation; but this objection applies to all methods. [The plan has much to commend it.]

Charles W. Townsend,⁵ in an article on **cream for home modification**, concludes that: "(1) Centrifugal cream is probably less desirable for infant-feeding than gravity cream, partly owing to its inaccuracy in the stated percentages. (2) Siphonage is reliable, but difficult to perform accurately and safely. (3) Dipping off top-milk is an accurate and safe method if carried out with reasonable care. (4) Pouring off the top-milk is accurate and extremely simple. (5) To insure perfect accuracy, frequent fat tests are required; but for practical purposes this is not necessary."

A. H. Wentworth,⁶ in 26 analyses of modified milk furnished by a commercial "establishment," found that every one of the modifications was incorrect. The percentage of fat was usually too low, that of the

¹ Arch. f. Kinderheilk., Bd. xxxvi.

² Jahrb. f. Kinderheilk., Bd. lvi.

³ Jour. Am. Med. Assoc., June 13, 1903.

⁴ Boston M. and S. Jour., Jan. 1, 1903.

⁵ Boston M. and S. Jour., April 16, 1903.

⁶ Boston M. and S. Jour., July 3, 1902.

proteids too high, while the sugar varied in either direction. These errors were appreciable. Such modifications are not nearly so accurate as home modifications with milk in which the percentage of fat has been accurately determined.

E. M. Sill¹ found unmistakable evidences of **rickets or scurvy** in 97 % of infants fed continuously on **pasteurized or sterilized milk** (179 cases in all). He therefore advocates the use of pure unheated milk. [No provision is made for the poor unfortunate who cannot obtain this.]

Thompson S. Westcott² emphasizes the **importance of whey** in preparing mixtures for cases of chronic gastrointestinal catarrh, when under-feeding for a considerable time becomes necessary; also in cases in which unusually low fat percentages must be given. For these, mixtures of milk and fat-containing whey are used.

Szekelz³ prepares cows' milk for infant-feeding by precipitating the casein and with it some of the lime and phosphates by passing fluid carbonic acid under high pressure through the milk. The composition of the whey so obtained is: casein, 0.3; albumin, 0.5; sugar, 4.8; ash, 0.55. Fresh milk must be used (skimmed milk is preferable) and the process must be quickly carried out. The precipitation of the casein is purely mechanical and the whey obtained almost sterile.

In view of our present limited knowledge, Chapin⁴ thinks it is a question whether it is wise to attempt to introduce into practical infant-feeding methods that call for mixtures of **different forms of protein** supposed to exist in milk.

The failure of an artificially fed child to gain in weight, in the absence of other symptoms of disturbed digestion, Ernest B. Emerson⁵ considers, is due to an **insufficient amount of sugar**.

Fürst⁶ emphasizes the **value of levulose** in children's diet. This fruit-sugar may be given pure, or as syrup or mixed with chocolate. It was well assimilated by children under 2 years of age and caused no digestive disturbances. Older children thrived on it during convalescence from acute diseases. Fürst also recommends levulose to improve the nutrition of scrofulous children.

W. M. Hartshorn⁷ finds that most babies of 7 months and over, either artificially fed or nursed, and whose digestion seems able to permit of extra feeding, increase more rapidly in weight if **bread and milk** are added to their diet. This seems to agree better than various infant foods and cereals. The bread should be stale, the crust removed, and the pulp well scalped. The water is then poured off and milk is added; this is boiled for 3 or 4 minutes, then sweetened and cooled. Never more than half an ounce is given at one time.

Louis Fischer⁸ reports 3 cases of **milk idiosyncrasy** in infants. All the usual attempts at feeding with natural or artificial milk failed, the children continually losing in weight, and passing undigested stools.

¹ Med. Rec., Dec. 27, 1902.

² Arch. of Ped., Nov., 1902.

³ Arch. f. Kinderheilk., Bd. xxxvi.

⁴ Arch. of Ped., Nov., 1902.

⁵ Boston M. and S. Jour., Dec. 4, 1902.

⁶ Zeit. f. diätet. u. physikal. Therapie, Bd. vi, 1902-03.

⁷ Med. Rec., June 27, 1903.

⁸ Jour. Am. Med. Assoc., Aug. 2, 1902.

No. 1 improved on Keller's malt soup with a small amount of milk added; No. 2, on meat-broths and cereal decoctions; and the third case, on almond milk. All of the children, while being fed on milk, ran a continuous temperature varying from 101° to 102° F.]We believe that true instances of milk idiosyncrasy are much rarer than is often claimed. Persistent, careful modifications of the milk formula will succeed in the end in most instances.]

Bendi has observed an infant in whom repeated attempts to administer egg were followed by an outbreak of **urticarial wheals**, with swelling of the eyelids and injection of the conjunctivas.

Arthur V. Meigs¹ reiterates his belief, first, that human milk never contains more than about 1 % of casein (nitrogenized element); and second, that the quantity, but not the strength, of the **Meigs mixture** should be increased until after the sixth to the ninth month. Until that time, his milk mixtures only contain 1 % of casein. In discussion, Joseph E. Winters expressed emphatic objection to centrifugal cream, to the use of heat in preparing milk for infants, and to the improper relative proportions between fat and proteids which are commonly in use: the fat is commonly too low and the proteid too high. J. P. Crozer Griffith fails to see that the objections to centrifugal cream are well founded. While preferring to use unheated milk, he does not believe that heat so materially affects the nutritive qualities of milk as is supposed. His one objection to Meigs's rule for feeding is its inflexibility as to the strength of the mixture.

Adolf Baginsky² recounts his large experience in the Emperor and Empress Frederick Hospital with **buttermilk as an infant food**. It is especially prepared from pure cream which is soured by lactic acid fermenting bacteria. The product is delivered as soon as finished. In preparing it for feeding, to 1 liter of buttermilk 15 to 25 grams of wheat flour and 35 to 50 grams of cane-sugar are added. With constant stirring this is boiled for 2 minutes. It is then poured into sterilized feeding bottles, stoppered with cotton, and kept on ice until used. Analyses of this product gave 0.35 fat, 3.4 albumin, 4.2 to 5.8 sugar, and 0.26 starch. The acidity varied from 60 to 80. The acidity is mainly due to lactic acid; small quantities of acetic and succinic acids are also present. The albumin (casein) is coagulated and in fine particles, owing to the flour. The buttermilk should be made from pure cream, and with all due regard to cleanliness and despatch. The amount given was estimated by the calorimetric method, each child receiving the number of calories which it would need for its normal weight. Baginsky's experience covers 300 sick cases, and his conclusions are that prepared buttermilk is a good food for acutely and chronically ill children; that it is well borne soon after attacks of acute dyspepsia and summer diarrhea; that in chronic diarrhea and enteritis it may be considered a life-saving preparation; and that he has never seen it cause rachitis or scorbutus. Additional observations upon healthy infants are needed. Except during the height of acute attacks, when no milk should be given, and in cases of "milk

¹ Arch. of Ped., Oct., 1902.

² Brit. Med. Jour., Sept. 6, 1902.

idiosyncrasies," he finds it usually successful. No attempt is made to explain the reason for its success.

Jacobson¹ thinks **buttermilk of great value** in the nourishment of both sick and healthy infants. It is especially well tolerated in cases of chronic gastroenteritis and congenital or acquired dyspepsia. Cachectic atrophic infants thrive on it. One quart of buttermilk must be thickened by adding one even tablespoonful of wheat, rice, or barley flour and brought slowly to the boil (25 minutes), stirring constantly. It must boil up several times; then 2 or 3 heaping tablespoonsfuls of cane-sugar are added. A porcelain vessel should be used. To prevent coagulation of the casein in coarse lumps use a cream beater constantly during the cooking; the casein will then be suspended in fine flakes which will pass through the nipple easily. A good specimen of buttermilk should show little or no free lactic acid and does not become contaminated easily with pathogenic bacteria. Three factors contribute to make buttermilk easy of digestion: the acidity, the absence of fat, and the fine state of division of the casein. Care must be taken that the buttermilk does not become too acid from age (7 to 10 cc. of $\frac{1}{4}\%$ normal NaHO solution will neutralize 100 cc. of good buttermilk). The large amount of sugar present (11 % to 13 %) in this buttermilk mixture helps to explain the rapidity with which infants gain in weight by its use. In some cases in which digestive disturbances arise on a buttermilk diet, 1 part of alkaline malt soup may be advantageously added to 3 parts of buttermilk. The transition from a buttermilk to a cows' milk diet must always be gradual. An infant can be fed on buttermilk for 8 to 10 months without harm. Mild rachitis may develop, but no very marked cases have been reported. Scurvy has not been observed.

According to Rubinstein's² investigations, typhoid, diphtheria, tubercle, and pyocyanus bacilli are destroyed in 24 hours when added to **buttermilk**. In sterilized buttermilk typhoid, diphtheria, and pyocyanus bacilli live for from 4 to 7 days. Boiling for 3 minutes or heating for $\frac{1}{2}$ hour at 80° C. certainly destroys these germs.

Carlyle Pope and Torald Sollmann³ confirmed Bordet's experiments of producing a **coagulating serum** for cows' milk proteid by injecting animals with cows' milk. They obtained similar results after boiling the milk which was injected. Prolonged feeding of large quantities of milk failed to produce a proteid-coagulating serum, so that they conclude that the specific modification of serum after injecting milk is not concerned in the nutritive value of that product.

From **metabolism** experiments on 2 healthy infants Cronheim and Müller⁴ find that **sterilized milk** is not adapted to nourish children for long periods of time. Lime absorption and assimilation are decidedly poorer on a diet of sterilized than on one of raw milk.

Cronheim and Müller⁵ also report metabolism experiments on 5 infants. They consider it demonstrated that: (1) A greater amount of **phosphorus**

¹ Arch. de Méd. des Enf., vi, 1902. ² Arch. f. Kinderheilk., Bd. xxxvi, p. 337.

³ Amer. Med., Sept. 13, 1902. ⁴ Jahrb. f. Kinderheilk., Bd. lvii, 1903.

⁵ Zeit. f. diätet. u. physikal. Therapie, Bd. vi.

is assimilated than is needed for the growth of the bones, considering that the excess of nitrogen assimilated over the amount required for bony development goes to form blood and muscle. The nervous tissue and the nuclei-containing glands must then have a considerable share in the metabolism of the first year. (2) Phosphorus is especially well assimilated when given as **lecithin** contained in the yolk of egg. (3) Bony development is not satisfactory on a diet of **sterilized milk**, even when yolk of eggs and the salts which go to form bone are freely given.

E. Hellesen¹ concludes from **metabolism** experiments that it is hard to protect the growing organism against a **loss of nitrogen** on a very low diet. When the number of calories of the milk mixture is only four-fifths of the calories in a diet which will preserve nutritional equilibrium, there will be a nitrogenous loss on a diet of fat and albumin; whereas, on a diet of albumin and carbohydrates, we may have a considerable retention of nitrogen in the organism, with a not inconsiderable loss of weight. If we are obliged partially to starve a child, it is best to reduce the fat until the caloric value of the diet represents four-fifths that which would preserve nutritional equilibrium.

F. Steinitz² concludes, on the basis of 4 metabolism experiments, that **feeding infants with milk rich in fat increases the excretion of ammonia** by withdrawing alkalies from the intestine. The alkalies, which—on a diet of milk with low fat—pass into the circulation and neutralize the acid products of intermediary metabolism, become fixed in the intestine and are carried out with the feces. The organism is thus forced, in order to prevent a great loss of its alkaline constituents, to substitute ammonia as a neutralizing substance. But the child's metabolism can to a limited extent only substitute ammonia in the place of fixed alkali. On a diet of milk with high fat percentage the body will lose a portion of its fixed alkalies (excretion of earthy alkalies is not affected), whereas retention of alkalies is an absolute necessity for the child's growth and welfare.

Nordheim³ reports the **daily weighings** of a breast-fed baby during the first 100 days of life. The child and its mother both thrived, and the quantities of milk taken were those of a normal healthy child. The child gained $2\frac{1}{2}$ kgm. in weight during this time.

Max Adam⁴ studied the food quantities taken by artificially fed infants in 12 cases. He estimated the calorie value of the milk and cream mixtures in each case. Low proteids (0.85 % to 1.7 %) and relatively high fat percentages were given. Various tables illustrate his method.

Beuthner⁵ studies the quantities taken by breast-fed babies, especially considering the quotient of energy. His figures are somewhat lower than those given by Feer. Camerer, comparing the **process of growth** in the infant and the adult, and the importance of different food-stuffs in metabolism, refers again to the nitrogen content of mother's milk, and emphasizes the importance of establishing physiologic averages in the

¹ Jahrb. f. Kinderheilk., Bd. Ivii, 1903. ² Jahrb. f. Kinderheilk., Bd. Ivii, 1903.

³ Jahrb. f. Kinderheilk., Bd. Ivi, 1902. ⁴ Jahrb. f. Kinderheilk., Bd. Ivi, 1902

⁵ Jahrb. f. Kinderheilk., Bd. Ivi, 1902.

nutrition of the infant. Schlossmann reports a metabolism experiment in a child 6 months old, fed on diluted cream, mother's milk, buttermilk, and buttermilk with cream. The child gained most while fed on buttermilk. The technic and importance of **calorimetric investigations** in infant-feeding are discussed at length.

Hedenius¹ investigated the **starch-digesting capacity of the infant's intestines**. From the result of 10 metabolism experiments he concludes that infants over 3 months of age digest starchy foods better than those under 3 months. An infant of 2 months will tolerate a starchy diet, such as malt soup, better after time has elapsed to accustom the digestive apparatus to starch. In general, the simpler forms of carbohydrate food are better tolerated and digested than malt soup and Zwieback decoction.

INFECTIOUS DISEASES.

J. L. Morse² believes that typhoid infection through the placenta is not as a rule complete; hence the lesions of **fetal typhoid** are usually not characteristic. In most cases the spleen shows typhoid bacilli. The septicemic nature of the infection accounts for the high mortality of fetal and congenital typhoid. Intestinal lesions may be found in infants who have lived 3 weeks. Under 2 years of age typhoid fever is **apparently not frequent**. A more general use of the Widal reaction and cultures from the blood and stools may show cases of typhoid which are not recognizable by clinical tests.

Nobécourt and Voisin³ call attention to the **infrequency of typhoid fever in infants under 2 years**. Out of 39 cases in children treated in the last 5 years, 3 were infants. They report a fatal case complicated by severe enteritis. The Widal reaction was positive on the tenth day of the disease in a dilution of 1: 30. The authors do not think that the agglutinative power is less in children than in adults. They think that a positive reaction with a dilution of 1: 10 is sufficient if agglutination occurs after 15 to 20 minutes. The mortality of typhoid fever in infancy often reaches 50 %.

J. P. Crozer Griffith⁴ believes that **typhoid is far less rare** in infants than has generally been supposed. The disease differs principally from that met in older children in its onset and shorter course, and in that the nervous symptoms overbalance the intestinal. Bronchitis is very common and diarrhea not infrequent in infantile typhoid. Rose-spots and enlarged spleen are present in nearly all cases. The average duration of the disease is from 14 to 21 days. In older children more or less headache, apathy, and delirium occur. The Widal reaction may be very late in appearing. The prognosis is less favorable in infants than in older children. A brief immersion in tepid water is usually preferable to general sponging, but hydrotherapy of any sort often does more harm than good.

¹ Arch. f. Verdauungskrankh., Bd. viii, 1902.

² Boston M. and S. Jour., April, 1903.

³ Rev. Mens. des Mal. de l'Enf., Jan., 1903.

⁴ Boston M. and S. Jour., April 9, 1903.

J. P. Crozer Griffith and Maurice Ostheimer¹ give the results of a review of the literature on **typhoid fever in children of 2½ years and under**, with abbreviated reports of 325 positive and 92 doubtful cases. Of these, 23 were congenital cases. The Widal reaction was reported positive in only 44 cases.

Abt² studied 200 cases of **typhoid fever** in children. Of these, 4 were under 2 years of age. Sudden rise of temperature with vomiting marked the onset of the disease in most cases. Headache was constant, chilliness and epistaxis not infrequent. Rapid, irregular pulse was noted in the younger children. The fever was remittent in nearly every case. Relapses occurred in 10 %, most of them mild and of short duration. In children under 4, restlessness and crying were constant; in many mild cases there was marked apathy; delirium was noted in older children not infrequently. Constipation was oftener met than diarrhea. The stools were usually not characteristic, containing in younger children mucus and undigested milk. Hemorrhage was rare; perforation occasionally occurred. Enlarged spleen and rose-spots were found in nearly all cases, often before the end of the first week, and persisted until convalescence. The Widal reaction was positive in all but 2 cases. The mortality was less than 4 %.

A. C. Cotton³ believes that careful application of the **Widal test** will reveal many cases of **typhoid fever in infants** and young children which from the clinical symptoms alone would have escaped diagnosis. Prodromes are often absent, the onset is sudden with high temperature and acute intestinal symptoms, and the duration of the fever may be not over 7 to 10 days, there is less toxemia, stupor, and coma than in adult life, and meteorism is exceptional. Fever is often irregular and defervescence abrupt. Relapses, hemorrhages, perforation, and severe complications are less frequent than in adult life; lesions of the skin are more common. The author reports 20 cases, the youngest 3 years old. Rose-spots and enlargement of the spleen were found in all but 2, and the Widal reaction was positive in all but 1; headache was present in 15 cases. All recovered.

A. D. Blackader⁴ discusses the **symptoms and etiology of typhoid fever in children**, making special reference to the Widal reaction. He mentions the conveyance of infection by means of the child's fingers, by flies, and by wind-driven sand. In the city of Tunis, where all the refuse is thrown in the streets, he has been informed that 75 % of the cases of typhoid occur in children. In early childhood there is less susceptibility to the disease than later. In children, as a rule, typhoid runs a shorter and milder course than in adults. They appear to offer a greater resistance to the infection, and to overcome it more readily. As to differences in susceptibility, children who show a tendency to gastric disturbance seem to be much less liable to have typhoid than those subject to intestinal trouble, and it may be that the acid secretions of the stomach have something to do with this comparative immunity. On the other hand, hyperemia or other abnormal conditions of the intestines

¹ Am. Jour. Med. Sci., Nov., 1902.

² Clin. Rev., June, 1903.

² Chicago Med. Recorder, Oct., 1902.

⁴ Boston M. and S. Jour., April, 1903.

would appear to constitute a predisposing factor as regards this disease. Another predisposing factor is the lowering effect of other diseases. There may, in fact, be a double infection, as the searlatinal and typhoid; the typhoid bacillus has been found in the blood of patients suffering from scarlet fever. Infection at the same time with meningitis has also been observed. In making tests for typhoid Blackader has been accustomed to use **Ehrlich's, as well as Widal's, method.** Widal's reaction, he thought, should be sought for every second day. In a series of 50 cases it was found by the tenth day in 19, between the tenth and twentieth day in 23, and between the twentieth and thirtieth day in 4; in 1 case the reaction was not obtained until the forty-sixth day, and 3 cases failed to give any reaction.

Frank S. Churchill¹ concludes, from a study of the **Widal reaction in infancy**, that it occurs under the same conditions as in adults; it is perhaps weaker in early life. Available evidence is overwhelming in favor of the theory that a positive reaction indicates typhoid fever, regardless of symptoms and physical signs. It is of especial value in the detection of mild or obscure cases.

Churchill² studied the **blood in 47 cases of typhoid**, ranging in age from 22 months to 12 years. Two of them were infants, 39 cases were uncomplicated, and on these only his averages are based. The red blood-corpuscles are reduced in number, especially during the first 3 weeks, after which they increase rapidly, reaching normal in the fifth week. The hemoglobin suffers more proportionately than the erythrocytes. The leukocytes are reduced during the first 4 weeks, and are lowest during the second week, except in severe and prolonged cases. The relative proportion of the different varieties of leukocytes varies at different periods of the disease, the greatest variations being found in the polymorphonuclear and mononuclear elements; the former diminish and the latter increase as the disease advances. The increase in the mononuclears is chiefly in the lymphocytes.

A. Seibert³ reports 2 cases of **typhoid fever** in children **beginning as appendicitis**, confirmed by operation, and remarks upon the rarity of this association.

Bernard⁴ observed at the end of the first and the beginning of the second week of **typhoid fever, small tumors in the region of the ileocecal valve**, varying in size from a hazelnut to a pigeon's egg. He believes that these tumors were the swollen Peyer's patches, and considers the sign of value in the early diagnosis of typhoid.

Baginsky⁵ found **streptococci present** in the throats of 696 out of 701 children ill with **scarlet fever**. The same organism was found in 100 autopsies. He believes that scarlet fever is caused by the streptococcus, and has treated most cases within the last few years with anti-streptococcus serum. While his results were favorable, Baginsky does

¹ Chicago Med. Recorder, Oct. 15, 1902.

² Boston M. and S. Jour., June 25, 1903.

³ Arch. of Ped., Sept., 1902.

⁵ Jahrb. f. Kinderheilk., Bd. lvi, 1902.

⁴ Arch. f. Kinderheilk., Bd. xxxvi.

not assert that the injections exerted a positive influence on the disease. Small doses (10 cc.) are harmless; larger ones (20 cc.) are not without danger.

Salge¹ reports **agglutination tests** with the blood-serum in scarlatina on the streptococci found in this disease. He used a dilution of 1: 500 and obtained positive results.

Charlton² is not convinced that a **streptococcus is the cause of scarlet fever**, but looks on it as the **producer of a secondary affection** to which most, if not all, of the unfavorable complications of the disease are due. For this reason he believes in the use of antistreptococcus serum.

Ludvig Hektoen³ concludes, from the **bacteriologic examination of the blood** during life in **scarlet fever**, that streptococci may occasionally be found in the blood in mild and uncomplicated cases; that they occur with relatively greater frequency in the more severe and protracted cases in which there also may develop local complications, such as joint-inflammations; even in these, spontaneous recovery may occur; finally, that streptococcemia may not be demonstrable in fatal cases. The theory that scarlet fever is a streptococcus disease does not receive any direct support from these observations.

W. K. Jacques⁴ believes that **Diplococcus scarlatinæ** (Class's coccus) is the **cause of scarlet fever**. It is capable of passing through the mucous membrane, through wounds, or the genital tract, of rapidly multiplying in the blood, and of passing out again through the skin. The susceptibility of the blood is essential in the production of the disease. Children who have had scarlet fever may get an angina due to the Class coccus, but because of their immunity, scarlet fever would not result. Jacques makes use of impression cover-slip preparations from metal culture-boxes after a few hours' incubation, instead of removing a specimen with a platinum wire from test-tube cultures. In this way it is possible to determine which germs have multiplied most rapidly—a distinguishing feature of the growth of the Class coccus. In some cases the culture has decided the nature of the disease before the appearance of the rash.

Karl Leiner⁵ believes that **burns may become the portal of entrance** for scarlatinal poison, or that they predispose to scarlatina.

A. Bankier Sloan⁶ finds **154 relapses of scarlet fever** in 14,143 cases, in the annual report of the Metropolitan Asylums Board (Glasgow).

Henry Fraser⁷ reports a case of undoubtedly **relapse of scarlet fever** occurring 6 days after the patient has been allowed to get up. The theory of autointoxication due to a short-lived immunity is interesting in connection with the fact that this patient was 20 years of age.

C. Killick Millard⁸ defines **return cases of scarlet fever** as those

¹ Jahrb. f. Kinderheilk., Bd. lvi, 1902.

² Montreal Med. Jour., Oct., 1902.

³ Jour. Am. Med. Assoc., March 14, 1903.

⁴ Jour. Am. Med. Assoc., Dec. 6, 1902.

⁵ Jahrb. f. Kinderheilk., Bd. lvi, 1902.

⁶ Lancet, Feb. 14, 1903.

⁷ Lancet, Nov. 29, 1902.

⁸ Brit. Med. Jour., Aug. 16, 1902.

caused by the carrying home of infection by patients returning from a hospital. The infective influence of these cases persists for a long time—at least 6 weeks. Discharges from the nasal and aural passages, or unhealthy conditions of the mucous membranes, are the most frequent sources of infection. The fatality of return cases is above the average. It is probable that the germ of scarlet fever persists in a more or less virulent condition in the nasal and aural secretions of these discharged patients. Since return cases of scarlet fever rarely arise after treatment of scarlet fever at home, and since the herding of large numbers of patients together in hospital wards appears to prolong the duration of infection, F. M. Turner suggests to substitute an ordinary house for a hospital, and separate rooms for large wards. Disinfection of the skin, nasal, aural, and pharyngeal membranes must be carried out rigidly during the whole duration of convalescence, as well as during the disease.

Heubner¹ examined the **kidney** in 2 pure cases of **scarlet fever** and **diphtheria** respectively. In the former there was a pronounced hemorrhagic affection; the glomeruli were principally involved and the epithelium secondarily. In diphtheria there was little, if any, hemorrhagic tendency. The degeneration of the epithelium was primary and occurred only in parts.

Doebert² observed 10 cases of **scarlatina following measles**. In half the cases the scarlatinal eruption was indistinct and of short duration. Diarrhea was frequent and complications unusually numerous and severe. The mortality was 22 %.

Escherich³ believes that with the discovery of **Moser's serum**, we have come to a turning-point in the treatment of scarlet fever. No previous method of treatment has even approximated to such favorable results, and (possibly excepting von Leyden's convalescent-serum) no other method pretends to attack the etiologic factors and manifestations of the disease as a whole. The large quantity of serum required and its costliness limit its use to the severest cases.

Paul Moser⁴ has treated the cases of scarlet fever in the St. Anna Children's Hospital in Vienna since November, 1900, with **antistreptococcus serum**, obtained by simultaneous inoculation of several varieties of streptococci taken from scarlet-fever patients. Two horses were used for this purpose. Two cases received injections on the first day, 15 on the second, 17 on the third, 18 on the fourth, and 19 on the fifth day, and 13 cases received injections on the seventh to the tenth day. The amount of serum used varied from 30 cc. to 180 cc. The best results were obtained the earlier the injections were given, and with the larger doses. Of the 84 cases, 16 were fatal. Rapid improvement in the general condition was noticed in many cases within 24 hours after the injection. The duration of the eruption and the course of the fever were appreciably shortened, and disturbances of the heart, lungs, and nervous system favorably influenced, as were the inflammatory processes in the nose and throat. The usual complications following serum injections occurred;

¹ Münch. med. Woch., No. 4.

³ Wien. klin. Woch., No. 23, 1903.

² Jahrb. f. Kinderheilk., Bd. lvii, 1903.

⁴ Jahrb. f. Kinderheilk., Bd. lvii, 1903.

but in no case could nephritis be ascribed to the action of the serum. Since three-fourths of these cases were severe with doubtful prognosis, Moser believes that his serum exercises a favorable influence on the grave forms of scarlet fever.

Pospischill¹ used **Moser's serum** in 26 cases of scarlatina. Of 12 cases with doubtful prognosis, 9 recovered; of 13 with fatal prognosis, 5 recovered. Pospischill noted as direct results of the injection, fall of temperature, diminution in the frequency of the pulse and respiration, fuller and stronger pulse, loss of cyanosis, quiet sleep, and clearing up of the nervous symptoms.

Scholz² treated 9 cases of scarlatina, most of them light, with injections of from 5 cc. to 20 cc. of **convalescent-serum**. The injections were made on the first to the third day of the disease, were well borne, but did not lead to the desired result. Critical fall of temperature and distinct influence on the course of the disease were not observed.

Von Leyden³ also employed **convalescent-serum** in the treatment of 16 cases of scarlet fever in children over 12 years of age. Of these, 6 showed rapid improvement from the time of injection, and in 9 the results were less marked. In the latter the temperature began to fall by lysis; on the third day in 1 case, on the fourth day in 2 cases, on the fifth day in 4 cases, and on the sixth day in 2 cases. The temperature remained at normal on and after the fifth day in 3 cases, twice each on the sixth, seventh, eighth, and ninth days, and once on the tenth day. Von Leyden urges further study along these lines.

E. W. Saunders⁴ employs **pilocarpin** in his treatment of scarlet fever, since there are no contraindications to its use in either heart or lungs. The effects are moderate reduction of temperature (when not hyperpyrexial), rapid improvement in the state of the oral and faucial mucous membranes, and prevention of glandular infection (through increased stimulation of the salivary and mucous glands). It should not be given immediately in conjunction with the coal-tar antipyretics. Disturbance of the stomach should be avoided. Atropin furnishes a complete antidote in case of an unsuspected idiosyncrasy for the drug.

Julius Grosz⁵ recommends for the treatment of scarlet fever **cold packs, cold compresses, or an ice-collar about the neck**, and cleansing of the nose and throat with 3 % boric acid solutions or 1 % chlorate of potash every 1 or 2 hours. When nephritis exists, a milk-diet should be used; or if milk is not tolerated, cereal, coffee, eggs, and kefyr. Digitalis, when the pulse is weak and rapid, combined with acetate of potash or diuretin, increases the flow of urine during the febrile stage; after the fever falls and the heart grows stronger, hot baths are often of service (provided the lungs are clear) in increasing the flow of urine. The patient is rolled in blankets after the bath and allowed to sweat for 1 or 2 hours.

Polievtkoff⁶ injects a 3 % solution of **carabolic acid** directly into the

¹ Wien. klin. Woch., No. 15, 1903.

² Fortschr. d. Med., No. 11, 1903.

³ Deut. Arch. f. klin. Med., Bd. Ixxiii, 1902.

⁴ Arch. of Ped., Feb., 1903.

⁵ Arch. f. Kinderheilk., Bd. xxxiv, 1902.

⁶ Medizinskoe Obozryenie, lvii, No. 10.

tonsils or soft palate in cases of scarlet fever. The injection is made on each side once a day, until the fever subsides, which usually occurs in 4 or 5 days. One gram is used for children under 6; 2 grams, over 6. In 110 hospital patients his mortality has been 16 %.

The committee of the Massachusetts Association of Boards of Health¹ estimates that from 1 % to 2 % of the general public in cities **carry diphtheria bacilli in their throats.** Among persons exposed to diphtheria the percentage will vary from 8 % to 50 %. Laboratory experiments seem to show that only a small percentage of these bacilli in the throats of persons not recently exposed are virulent, although this small percentage probably constitutes an important factor in the dissemination of diphtheria. As isolation of these persons is impossible, even in the case of those recently exposed to contagion, thorough instructions must be given to them as to the precautions necessary, the disposal of the oral and nasal secretions, etc.

Brunon,² from a **collective study** of the cases of diphtheria admitted to the Rouen General Hospital from 1882 to 1901, finds that the mortality and frequency of this disease increased steadily from 1882 up to 1895, in which year the disease reached its height, and 400 cases were treated. In ordinary years 50 to 100 cases were treated. In 1895 the serum treatment became general. Previous to this the recoveries varied from 34 % to 58 %. Since 1895 the recoveries were from 74 % to 87 %, making the average before 1895 46 %, and since 1895 80.57 %. Large doses of serum were used, and hot baths were given as adjuvants; intubation has largely supplanted tracheotomy.

Jaeger³ shows that the **diphtheria mortality** at the Mülhausen Bürgerspital has fallen from an average of over 50 % in 1892, 1893, and 1894, to an average of 20 % and less in the years 1897, 1898, 1899, and 1900. The mortality of laryngeal diphtheria fell from 65-68 % to 21-25 %; in the cases operated on the mortality diminished one-half, and there were many more cures without operation. In 1899 and 1900 diphtheria was prevalent and severe, so that the falling off in the mortality cannot be ascribed to a milder form of infection.

M. Howard Fussell⁴ is convinced that there has been no **change in the type of diphtheria** in his experience of 18 years. Since he has been using antitoxin, he has had 1 death, which occurred 8 hours after his first visit. He invariably makes cultures, so that no mistake in diagnosis has increased his percentage of recovery. He injects antitoxin at once, and repeats at 6 or 12 hour intervals if necessary.

Cruchet⁵ discusses the various forms of **pseudomembranous angina**, which may be classified as follows: (1) Pseudodiphtheric or diphtheroid angina, due to various microbes, not to Klebs-Löffler bacilli. (2) Pseudodiphtheric angina due to pseudodiphtheria bacilli (bacilli of Hoffmann). (3) Pseudodiphtheric angina due to pseudodiphtheria

¹ Amer. Med., Editorial, Sept. 16, 1902, p. 390.

² Bull. de l'Acad. de Méd., xlviii, 1902.

³ Deut. Arch. f. klin. Med., Bd. lxxiii, 1902.

⁴ Phila. Med. Jour., Oct. 25, 1902.

⁵ Arch. de Med. d. Enf., vi, 1903.

bacilli other than Hoffmann's bacillus. (4) Diphtheric angina due to Klebs-Löffler bacilli. Less commonly the streptococcus, the staphylococcus, the colon bacillus, the tetragenus, the bacillus of Friedländer, and other cocci may give rise to diphtheria. Whenever an angina takes on a diphtheric character, no matter what microorganisms are found associated with it, it is safer to treat it as a case of diphtheria.

Ellegood¹ considers that "**pseudomembranous inflammation** of the mucosa of the croupous or **diphtheric type**" is always caused by the Klebs-Löffler bacillus in some phase of its existence. This bacillus is a facultative saprophyte and is not virulent in the saprophytic stage of its existence. The degree of toxicity manifested depends upon certain unknown vital conditions of the microorganism, upon the anatomic character of the part attacked, upon the degree of immunity possessed by the blood and tissues of the body on which it finds lodgment, and upon the effect on the specific germ and its toxins of associated bacteria and their products.

Mensi² states that **primary nasal diphtheria** is more common in nurslings than in older children. It is also more common than primary pharyngeal diphtheria in nurslings. The cases exactly resemble syphilitic coryza in the appearance of the discharge, and can be distinguished only by bacteriologic examination. The course of the disease is usually favorable and complications are rare, and may usually be prevented by the early use of antitoxin.

G. C. Crandall³ observed a case of **recurrent diphtheria**. A child convalescing from pneumonia suffered from diphtheric attacks occurring January 7, February 4, March 26, and April 6. In each attack membrane was present, typical Klebs-Löffler bacilli were found, and after the third attack serious heart symptoms developed. The use of the antitoxin did not give immunity against the subsequent infections.

Girard⁴ considers pallor of the face and mucous membranes a valuable premonitory symptom of grave **cardiac trouble in diphtheria**. In some cases cardiac erethism is shown by the exaggeration of the intensity of the heart-sounds as contrasted with the extreme feebleness of the pulse. Sometimes a singular apathy of the patient gives warning of cardiac involvement.

Frederick Fenton⁵ draws attention to the **danger-signals of heart-failure in diphtheria**, namely: abdominal pain, epigastric or umbilical, during which the child is usually pale and depressed; occurring with the pain, or a few hours after it, there may be vomiting. The pulse is weak, but in contrast to the weakness of the heart the muscular strength of the body is preserved. Fenton considers that epigastric pain and vomiting, especially if associated, are of serious prognostic import, and does not think they have been sufficiently emphasized.

Barbier⁶ finds that **cardiac thrombosis** is one of the most important

¹ Internat. Med. Mag., May, 1903.

² Giorn. del R. Acad di Med. di Torino, Feb., March, 1903.

³ St. Louis Med. Rev., Sept. 13, 1902. ⁴ Gaz. Heb. de Med. et Chir., Oct. 2, 1902.

⁵ Canad. Pract. and Rev., March, 1903. ⁶ Rev. de Malad. d. l'Enf., xx, 1902.

secondary causes of death in diphtheria. The thrombi are usually found in the right side of the heart. The clinical symptoms are generalized pallor, cool extremities, immobility, small filiform pulse, sometimes slight cyanosis, and often an expression of anguish with complete consciousness.

Comby¹ reviews at length **serumtherapy in diphtheria**. He recommends dosage of 2000 units for children under 2 years, and 4000 for those over this age. For severe cases or those seen late in the disease, and for membranous croup, these doses must be doubled or trebled and repeated within 24 hours. In some cases we must use as much as 80 cc. or 100 cc. to be successful. Marked cases of pulmonary tuberculosis and long-standing nephritis require careful dosage. Prophylactic injections eliminate diphtheria as a complication of measles, scarlet fever, and whooping-cough. More than 16 % of Comby's cases developed crup-tions due to the injections of serum, besides other complications, such as arthralgia and myalgia, albuminuria, angina, enteritis, etc. These accidents are unimportant, however, and serumtherapy remains the sovereign remedy for diphtheria.

In order to avoid the **serum exanthems**, Monti² only uses diphtheria serum which is perfectly clear. When it is not clear, it should be heated to 35° C. and the process repeated until the white flocculent precipitate has disappeared. If heat will not accomplish this, the cloudy serum should not be used. In order to obviate the necessity for injecting large quantities, a serum of high potency should be selected.

Emil Wieland³ holds that the favorable influence of **antitoxin treatment in laryngeal diphtheria** consists essentially in its local effect on the diseased mucous membrane, and is most evident in protracted cases where the toxemia is not marked. The serum also prevents the further production of the diphtheric poison, and so has prophylactic value.

Charles Gilmore Kerley⁴ formulates these **principles in the treatment of diphtheria**: With visible membrane, inject at once and take a culture; in croup, inject if there is inspiratory and expiratory obstruction; reinject in 12 hours unless improvement is marked, and at 12-hour intervals until the membrane disappears. The dose should be 2000 units for a child under 1 year of age; 3000 units over that age.

Cairns⁵ treated 20 severe cases of diphtheria by the **intravenous injection of antistreptococcus serum**. The dose varied from 20,000 to 35,000 units. His results were sufficiently favorable to warrant a more extended trial of this method. The indications for intravenous injection are: malignant forms of diphtheria, marked toxemia, and complications in the lungs. Out of a total of 50 patients treated, 16 were operated on, and only 3 died.

Schworer⁶ draws these conclusions from laboratory experiments: (1) A serum obtained by immunizing against diphtheria bacilli will agglutinate, in high dilution, diphtheria bacilli. (2) This serum **agglutinates**

¹ Arch. de Med. des Enf., May, 1903.

² Jahrb. f. Kinderheilk., Bd. lvii, 1903.

⁵ Lancet, Dec. 20, 1902.

² Arch. f. Kinderheilk., Bd. xxxv.

⁴ Arch. of Ped., Oct., 1902.

⁶ Wien. klin. Woch., No. 48, 1902.

pseudodiphtheria and other bacilli when its potency is that of normal horse-serum. (3) Agglutination by the highly diluted serum allows of differentiation between the diphtheria and the pseudodiphtheria bacilli. (4) The serum obtained by immunizing against pseudodiphtheria bacilli agglutinates only homologous types of bacteria. (5) There is more than one type of pseudodiphtheria bacillus.

Wasserman¹ has succeeded in producing a powerful serum which dissolves diphtheria bacilli and causes both agglutination and precipitation. He mixes 20 cc. of a 1 % solution of ethylene diamine with 1 gram of bacilli thoroughly dried, killed, and ground in a mortar. After filtration the toxins are neutralized with diphtheria antitoxin and the filtrate then injected into animals. He suggests that this new serum might be combined with the specific antitoxin and thus enhance the benefits of the latter.

Lipstein² has inoculated animals with large amounts of living or dead diphtheria bacilli after previously injecting diphtheria antitoxin, and has obtained a serum with great agglutinating power; this seems to be most marked on bacilli of the family from which the serum was derived.

Irving M. Snow³ reports a case of diphtheria with Escherich's symptom-complex—**pseudotetanus**. This bears much resemblance to true tetanus, having in common the symptoms of trismus, opisthotonus, muscular crises, and laryngospasm. It may occur as an independent malady or associate itself with an acute infectious process such as diphtheria, scarlatina, etc. Escherich classifies it as a rare type of tetany. Two forms of this disease are seen: (1) Intermittent muscular contractures, characterized by short painful cramps, heightened mechanical and electric excitability, running an acute or subacute course and tending to recur. (2) Persistent muscular contractures characterized by a painless and chronic course, continuing even in sleep for weeks and months; especial nerve excitability may be absent. The contractures may involve single muscles or may affect the entire body. When the masseters and dorsal muscles are principally involved, Escherich gives to that condition the name pseudotetanus. The onset of pseudotetanus is usually abrupt. The initial symptoms resemble true tetanus; muscular crises are comparatively mild and few in number. The disease lasts from 1 to 6 weeks, and all reported cases have recovered. The patient is comfortable and even cheerful in his unnatural position. Escherich has also described a pseudotetanus of the newly born with opisthotonus and recurrent arrest of breathing. Snow⁴ has reported two examples of this under the title of "Acute Respiratory Failure in the Newly Born." Snow's case of pseudotetanus occurred in a boy of 7, beginning on the second day of an attack of diphtheria. Violent muscular spasms and laryngismus lasted until the tenth day; the disease then assumed the tranquil type with persistence until the twenty-seventh day. The contractures were unaffected by tetanus antitoxin, but eventually yielded to morphin. On the thirtieth day he was able to walk and to eat solid food.

¹ Deut. med. Woch., Oct. 20, 1902.

² Am. Jour. Med. Sci., Dec., 1902.

³ Deut. med. Woch., Nov. 13, 1902.

⁴ Arch. of Ped., Oct., 1901.

John H. McCollom¹ maintains that **hospital accommodations** should be provided for cases of **measles** which cannot be properly cared for at home. The number of deaths and serious complications from measles justifies this position.

Brückner² has studied the **complications of the nervous system following measles**. Cerebral, spinal, and peripheral palsies occur, the spinal under the form of a diffuse myelitis. The prognosis is usually good, unless the lesions are very extensive.

R. W. Marsden³ considers that a differential diagnosis in a case of **suspected fourth disease** must include scarlet fever, the scarlatiniform variety of rubella, the morbilliform variety of rubella, and measles. While he does not deny the existence of Duke's disease, after a careful review of the evidence presented, he thinks that more conclusive details must be given before its definite nature is established. [We do not consider that the existence of the so-called fourth disease has in any sense been established.]

S. V. Vittlins⁴ observed 2 cases of **rubella followed by measles** and finally by **scarlatina**. Both of the latter were epidemic at the time, and sporadic cases of rubella had been observed; later this disease also became epidemic.

Influenza in children is a more malignant malady than is generally acknowledged, in the opinion of W. Carver Williams.⁵ Earache, glandular swellings, and a cough resembling pertussis are more common in children than backache, rigors, and pain in the limbs (Ashby and Wright). The invasion is more apt to be slow. The catarrhal manifestations of the disease appear to be due mainly to the Canon-Pfeiffer bacillus; the nervous circulatory and febrile manifestations may be regarded as of toxic origin. The severe complications of infectious disease, such as meningitis, neuritis, endocarditis, nephritis, etc., can all be found in influenza. Repeated relapses and grave sequels are as frequent in mild as in severe cases. Recently attention has been drawn to a chronic form of cough caused by the influenza bacillus. Whenever possible, the clinical diagnosis should be supported by microscopic evidence.

A. Hecht⁶ reports a case of **influenza and suppurative meningitis** in which influenza bacilli were found in the exudate between the meninges. There was no network of fibrin in the subarachnoid fluid when treated with Weigert's fibrin-stain. It would seem that the influenza bacillus, when it dominates the field, does not bring about any considerable exudation of fibrin.

Mya⁷ has observed 3 cases of fibrinopurulent **meningitis in breast-fed infants** due to the Pfeiffer bacillus, and thinks it must be included with Fränkel's diplococcus and the meningococcus as an etiologic factor in the epidemic form of fibrinopurulent inflammations of serous membranes.

¹ Boston M. and S. Jour., Jan. 8, 1903.

² Jahrb. f. Kinderheilk., Bd. Ivi, 1902.

³ Lancet, No. 4120, 1902.

⁴ Roussky Vratch, Dec. 24, 1902.

⁵ Jour. Am. Med. Assoc., July 4, 1903.

⁶ Jahrb. f. Kinderheilk., Bd. Ivii, 1903.

⁷ Gaz. degli Osped., Milan.

Leuriaux,¹ of Brussels, has isolated from the sputa of children suffering from **whooping-cough a short, broad, ovoid bacillus**, mobile, aerobic, staining with fuchsin and by Gram's method, and growing well at 37° C. on the ordinary culture-mediums. One cubic centimeter of bouillon culture injected intravenously into a rabbit's ear will cause death. Antipertussis serum [if we may so call it] is prepared like the antidiphtheric serum by inoculation of horses, with filtered culture in bouillon. The author treated 66 cases in all, with only 5 bad results, injecting from 5 cc. to 10 cc. of the serum. The early cases were cured and the severe ones much mitigated in severity.

Alfred Wanstell² considers that an **increase of the mononuclear over the polynuclear elements in the leukocytic count in cases of pertussis** in the catarrhal stage is a valuable aid in the diagnosis. In 19 cases he found only 3 exceptions.

Neumann-Leopold³ finds that diminution of the intensity of attacks of cough in pertussis does not run parallel with the diminution of the **viscosity of the sputa**; on the other hand, repeatedly a more tenacious sputum was present in the mild attacks than in the severe. This seems to indicate that the severe paroxysms of pertussis have a given relation to the lesser viscosity of the secretions of the air-passages. It may be that the cause of the severe attacks of cough is to be found in the greater mobility of the column of sputa and the increased quantity of the latter.

Charles J. Aldrich⁴ reports a case of **polyneuritis** in a boy with partial loss of power in the arms and legs, loss of reflexes, regurgitation of fluids, etc., which developed in the fourth week of an attack of pertussis.

Amat,⁵ in 2 severe cases of pertussis, gave immediate relief by **inhalations of ethyl iodid**. The duration and severity of the disease were decidedly mitigated by this treatment, after the usual drugs had failed.

In 96 cases Sobel⁶ has tested the method of treating the paroxysms of pertussis by **pulling the lower jaw downward and forward**. He found it was usually successful in the cases of children sufficiently old to understand the object of the procedure. The method was first suggested by O. Naegele in the attempt to control the spasm of the glottis. It is executed by standing behind the child, with both thumbs on the angles of the jaw and making downward and forward pressure with the index-fingers in the zygomatic arches, the remaining fingers on the chin. The mother or nurse can easily be taught the method, which overcomes the glottic spasm in the large majority of cases. The explanation of this result is uncertain, but the raising of the larynx and hyoid bone may open the glottis. The only contraindication is the presence of food in the mouth or esophagus. In infants and nervous children the crying produced by fear of the manipulation materially interferes.

T. W. Kilmer⁷ proposes a new application of an old principle, to con-

¹ Semaine méd., July 16, 1902.

² Amer. Med., Jan. 10, 1903.

³ Arch. f. Kinderheilk., Bd. xxxv.

⁴ N. Y. Med. Jour., June 6, 1903.

⁵ Jour. de Méd. de Paris, Aug. 17, 1902.

⁶ Med. Rec., April 18, 1903; Report N. Y. Acad. of Med.

⁷ N. Y. Med. Jour., June 20, 1903.

trol the vomiting during the spasmodic stage of whooping-cough. A stockinget band is placed around the chest and abdomen of the child and supported by shoulder-straps. On this is sewed a single width of elastic bandage, extending around the body and covering the abdomen. The bandage is sewed on when slightly on the stretch, and may be tightened if it fails to relieve the vomiting. The percentage of cases benefited seems to warrant its use. Its only disadvantage is that it sometimes produces a slight eczema.

Stursberg¹ obtained good results with **aristochin**, a preparation containing 96 % quinin alkaloid, in treating pertussis. Aristochin is easily soluble in weak solutions of hydrochloric acid, and may be given with a little water. Half a grain is a maximum dose for infants under 1 year. It has little or no taste.

Schlossmann² emphasizes the **frequency in infancy** of pure uncomplicated **tuberculosis**, which often runs its course without fever or tubercle bacilli in the sputa and feces. The tuberculin test is of value and harmless, if properly carried out. Primary tuberculosis of the intestinal tract is extremely rare. Early marked involvement of the bronchial glands is characteristic. Often the port of entrance is to be found in the tonsils and nasal or pharyngeal mucosa. Pathologically the subacute forms of tuberculosis predominate. Cavities are occasionally found; the brain, the meninges, and the bones are seldom involved. Infection is usually directly conveyed by contact with a tuberculous patient.

Alfred Hand, Jr.,³ studied the autopsy statistics of the Children's Hospital, Philadelphia, during the last 10 years. He concludes that the majority of cases of tuberculosis in infants and children are apparently the result of **air-borne infection**. A certain percentage of cases is of primary intestinal origin, probably the result of food-infection, as those cases which were subjected to exhaustive experimental study gave bacilli resembling the bacillus of bovine tuberculosis in all of its characteristics. From an anatomic standpoint, there is no way of distinguishing those cases of primary bronchial tuberculosis which might be the result of food-infection from those in which the infection is air-borne. The large proportion of cases in infants (over one-half) suggests either a greater exposure or a less resistance to the infection as compared with children over 2 years of age.

Olinto⁴ reports a case of **generalized tuberculosis without fever** in an infant of 4 months. Notwithstanding the rapid evolution of the lesions, and the widespread infection, febrile reaction and typical symptoms were absent. Tuberculous lesions were found in the thymus, the aorta, the pancreas, the intestines, and the broad ligaments.

Hohlfeld⁵ reports 2 cases of tuberculous disease of the lungs in infants aged 7 and 10 months associated with **cavity-formation** in the upper lobes. Tubercle bacilli were present in the sputa. Pulmonary hemorrhage occurred in the second case.

¹ Münch. med. Woch., Nov. 11, 1902.

² Jahrb. f. Kinderheilk., Bd. lvi, 1902.

³ Arch. of Ped., April, 1903.

⁴ Rev. Mens. d. Mal. d. Enf., xxl, 1903.

⁵ Münch. med. Woch., Nov. 25, 1902.

Ostmann¹ concludes from an extended study that a tuberculous family history predisposes to and has an unfavorable influence upon the course of **diseases of the ear**. These are not tuberculous, but the family taint renders the children less resistant.

The prognosis in **tuberculous peritonitis** has been summarized by G. A. Sutherland.² He considers that surgical treatment is not indicated except for certain complications, such as intestinal obstruction. The prognosis is good in uncomplicated cases; it is favorable even if tuberculous pleurisy is present; it is less favorable in case of a strong family history of tuberculosis, where hygienic and dietetic conditions are bad, where there is feeble resisting power, or in cases presenting a history of severe infective illness in early life; it is less favorable in the presence of continuous pyrexia, rapid wasting, persistent diarrhea, rapid pulse, recurrent acute exacerbations; it is less favorable in the presence of tuberculous intestinal ulceration, in extensive mesenteric caseation or of tuberculous masses, in localized suppuration from infection through lymph-nodes or the intestine, or in symptoms of intestinal obstruction. The prognosis is bad in case of rupture of a suppurating lymph-node or intestinal ulcer, in pulmonary tuberculosis, in tuberculous meningitis, and in general miliary tuberculosis. The prognosis is not appreciably affected by simple laparotomy.

T. M. Rotch³ gives the results of treatment of **tuberculous peritonitis** in early life, based on a series of 69 cases. Cases in which fluid is present with few or no adhesions, and with the absence of tuberculosis elsewhere, would seem to be the most favorable class for operation. Tuberculosis of the mesenteric lymph-nodes does not preclude a successful result. Insomuch as the presence of palpable masses and the absence of fluid do not preclude a successful operation, and insomuch as the degree of intestinal adhesions can only be surmised before operation, laparotomy would seem to be indicated in all cases of tuberculous peritonitis, provided (1) that the general condition of the patient permits it, and (2) that there is an absence of evidence of cerebral, pulmonary or extensive glandular or osseous tuberculosis. The presence of tuberculous ulcers of the intestines is obviously an unfavorable condition for operation, but in many cases they cannot be diagnosticated by the clinical symptoms. Of the 32 cases operated on, 20 recovered and were discharged relieved, and 12 died; 13 of the 20 cases discharged were traced. One of them has undergone a relapse, 2 died, and 10 are well; the remaining 7 cases were lost sight of. All but 2 were in excellent condition when discharged, and probably were permanently benefited by operation.

Comby⁴ believes that a large proportion of these cases can be cured by **hygienic measures**, careful dieting, air, sunlight, prolonged rest in bed, etc.

Leonard Guthrie⁵ believes that **medical treatment of tuberculous peritonitis** in children deserves more careful consideration. In 41 cases

¹ Münch. med. Woch., July 22, 1902.

² Arch. of Ped., Feb., 1903.

³ Jour. Am. Med. Assoc., Jan. 10, 1903.

⁴ Jahrb. f. Kinderheilk., Bd. lvi.

⁵ Arch. of Ped., April, 1903.

treated at the Paddington Green Children's Hospital, London, the surgical mortality was 50 % and the medical 16 %. Most of the medical cases were treated by mercurial inunction or by biniiodid of mercury, and recovered. Some got well without it. Medical treatment consists mainly in keeping the patient at rest, in supplying a nutritious and abundant diet, in the relief of incidental symptoms as they may arise, and, above all, in securing the advantage of open country air. In acute cases of ascites it is not advisable to interfere, unless the fluid produces great distention and distress. But in the more chronic cases, removal of the fluid is indicated by simple puncture, or by laparotomy. Dry cases will recover equally well without operation, provided no complications, such as extensive ulceration, septic peritonitis, meningitis, or advanced pulmonary phthisis, exist. On the other hand, surgical interference is absolutely necessary in cases of obstruction by adhesions or stricture, and where suppuration is suspected. F. C. Shattuck¹ emphasizes the importance of **good hygienic surroundings in the treatment of this disease.** The patient should remain in the hospital as short a time as possible. Medical treatment is justified for a certain time, if other conditions are favorable; the abdomen may be tapped if the fluid causes discomfort. After from 4 to 6 weeks of medical treatment, if there is no improvement, or sooner if the patient is losing ground, surgical treatment should be advised.

Hochsinger,² from the study of 17 children with **congenital syphilis**, found clinically demonstrable disease of the viscera and bones before the appearance of the exanthem. In a group of 14 cases observed during the first half year of life, no exanthem was present at any time. Hochsinger emphasizes the fact that when syphilitic disease of the viscera and bones is present, it always arises earlier than the skin lesions, and says this is an outcome of the embryologic development of these structures.

Maurice Ostheimer³ reports a case of a palpable tender nodule with general enlargement of the liver in a girl of 6 years, of undoubtedly **syphilitic parentage.** There were no other signs of hereditary syphilis. The nodule and general hepatic enlargement disappeared under specific treatment.

In the first years of life **syphilis** is by far the most frequent **cause of enlarged spleen.** Marfan⁴ in a series of 40 cases of chronic splenomegaly found three-fourths of the number syphilitic. This syphilitic hypertrophy is nearly always associated with anemia, light or severe; and may show the blood-changes of pseudoleukemic splenic anemia. There may be enlarged liver and polyadenitis. The coexistence of rachitis or pseudoleukemic splenic anemia with splenomegaly should always make us look for syphilis, which so often is associated with these conditions.

Hochsinger⁵ says that **specific osteochondritis** can be demonstrated

¹ Am. Jour. Med. Sci., July, 1902. ² Jahrb. f. Kinderheilk., Bd. Ivi, 1902.

³ Jour. Am. Med. Assoc., June 6, 1903.

⁴ Rev. Mens. des Mal. de l'Enf., May, 1903.

⁵ Jahrb. f. Kinderheilk., Bd. Ivi, 1902.

by the Röntgen ray in the well-matured fetus by the broadening of the zone of calcification and its irregular jagged form. This is of importance in the **diagnosis of hereditary syphilis** in the macerated fetus. It is often possible to demonstrate widespread disease of the epiphyses and periosteum of the long and short bones in living infants who presented no clinical symptoms. On the basis of these radioscopic findings Hochsinger attacks the theory of a spinal origin for the peripheral palsies in syphilitic infants. He thinks these should be classed as simple birth palsies with or without syphilis, or as toxic myotonias which can occur in nonsyphilitic infants.

Halsey DeWolf¹ reports 13 cases of **edema** which occurred within a period of 11 days in different wards of the Providence Lying-in Hospital. Of these patients, 9 died; in the remaining 4 the result was unknown, since they left the hospital against advice. All of the patients suffered from gastrointestinal disturbance except 1 (condition unrecorded), and in 9 there was albuminuria. In 4 of these 9 cases there was further evidence of kidney disease; in one, in which death occurred 1 month after the edema had disappeared, the kidneys were found to be normal, and in 1 the kidneys were found to be normal while the edema persisted. Three of the 9 cases did not come to autopsy. The edema was widespread, involving in some cases almost the entire body. Micrococci, bacilli, and streptococci were found in some of the internal organs in 3 of the cases. De Wolf considers that they were due to some common infection, possibly from the milk, which gained entrance through the gastrointestinal tract, and produced pathologic changes in the blood and bloodvessel-walls besides affecting to a greater or less degree the kidneys.

There seems to be some doubt as to the **transmissibility of "foot-and-mouth disease"** through the milk. Aphthæ and stomatitis in the human family are by no means rare, and while some observers have presented undoubted instances of the contagious nature of some cases, E. F. Brush,² in his investigations of the recent New England epidemic among cattle, was able to find only a few instances of it. Nevertheless, it seems to be undeniable that there is an aphthous condition and a herpetic affection which is caused by drinking the milk of cows affected by foot-and-mouth disease. The simplest way to diagnose between the contagious and the noncontagious form in children is to stop the milk; if it is caused by the milk, it subsides very quickly without further treatment.

Rudolph Gonser³ reports 32 cases of **acute osteomyelitis in infancy**. Most of them occurred during the winter months. *Staphylococcus pyogenes aureus* in pure culture was found in the blood and pus in 10 cases; *Staphylococcus pyogenes albus*, the streptococcus, the typhoid bacillus, and *Diplococcus lanceolatus*, once each. Osteomyelitis after typhoid fever is uncommon in children and rarely ends in suppuration or necrosis. Clinically there is no essential difference between *staphylococcus* and *streptococcus* osteomyelitis. In the latter the mortality is high during the first 10 years of life. After this, the prognosis is good. In 27 cases

¹ Arch. f. Ped., Dec., 1902. ² Jour. Am. Med. Assoc., June 20, 1903.

³ Jahrb. f. Kinderheilk., Bd. lvi.

of streptococcus infection collected from literature, the femur was affected most often; next in frequency the humerus, the pelvis, the tibia, the radius, the ulna, and the metatarsus. In the author's cases the femur and tibia were most often the seat of disease; next, the humerus. In one-fourth of the cases the localization was multiple. The mortality was 18.75 %. When the disease ran a long course, shortening of the limb followed as a rule, especially when the epiphyses were affected.

E. Grande¹ uses a 5 % guaiacol ointment in **parotiditis**, spread over the entire parotid region and covered with carbolized cotton. The dressing should be renewed every 24 hours as needed. Pain and swelling usually disappear after the second or third application.

McFarland,² from a careful study of the cases of **tetanus following vaccination** in 1901, concludes that the majority of cases followed the use of a certain virus, a small number after the use of various viruses. Atmospheric and telluric conditions were not responsible for the outbreak, but contamination of the virus from manure or hay, proving that greater care is necessary in preparing the vaccine virus.

The bacteriologic findings in a fatal case of **tetanus following vaccination**, says Gradwohl,³ show that the tetanus bacillus was engrafted on a vaccination-wound from exposure to the air or clothing or fingernails of the child, the "seab" having fallen off a day or two before the infection occurred.

DISEASES OF THE ALIMENTARY TRACT.

Escherich⁴ advises a **sucking bag** in the **treatment of thrush**. A cotton tampon is impregnated with boric acid and a little saccharin, inclosed in a silk or cambric sac, and sterilized. On sucking this, there is a continuous action of the boric acid on *Saccharomyces albicans*, the infecting agent.

A. Trambresti⁵ concludes from his own experience and that of Cornba, Longa, and others, that **noma is not to be regarded as a specific disease**, but as a form of gangrene which may be caused by a variety of microorganisms in association with the species commonly found in cavities of the body which communicate with the exterior.

Charles J. Aldrich⁶ reports a case of **angina ludovici** due to infection from the frænum linguae. A midwife had torn this with a brass safety-pin to relieve the condition of tongue-tie.

Baron⁷ studied the **ulcerating membranous forms of angina**, especially from the bacteriologic standpoint. He thinks that when we find the fusiform bacillus of Vincent or the spirochæte present in a membranous sore throat, we can with great probability exclude diphtheria.

E. W. Mitchell⁸ records a case of **amygdalitis** followed by appendicitis, nephritis, and endocarditis, in which the infection probably originated in the tonsil.

¹ Gaz. degli Osped., Aug. 10, 1902.

² St. Louis Med. Rev., Aug. 23, 1902.

³ Il Polliclinico, Sept., 1902.

⁴ Arch. f. Kinderheilk., Bd. xxxv.

⁵ Lancet, Sept. 13, 1902.

⁶ Le Nord. Med., Oct. 11, 1902.

⁷ Arch. of Ped., June, 1903.

⁸ Arch. of Ped., March, 1903.

M. Wagner¹ records a remarkable case of **suffocation from ascarides**. Large numbers of the worms had been evacuated and vomited. After death a large clump of them was found in the entrance to the glottis.

Adolph H. Meyer² in investigations on the **gastric juice** confirms the work of others, that the acidity and secretion of pepsin are much lower in infants than in children and adults. Hyperacidity can occur in some forms of gastrointestinal catarrh. Such investigations are of little clinical value, since no greater variations in the secretions were present under abnormal conditions than those which normally occur from day to day from unknown nervous influences. The normal degree of acidity of the gastric juice in healthy infants could not be determined.

Von Hecker³ finds that the method of Pentzoldt and Faber to test the power of **gastric absorption** by the iodid of potash test is useful for diagnosis of the severity of different affections of the gastrointestinal tract in infants, whereas the salol method of Ewald has no practical value. Absorption from the stomach is more rapid during the first 4 years of life. It is least active in acute gastroenteritis and in dyspepsia; to a less degree in acute enteritis and acute colitis. The severity of the digestive disturbance shows itself in the absence of free hydrochloric acid, in the presence of organic acids, and in the faintly acid or neutral reaction of the gastric contents.

F. L. Wachenheim⁴ insists that **chronic gastritis** is one of the commonest affections of childhood, and is often associated with **motor insufficiency**. For diagnostic and therapeutic purposes he advocates the frequent use of the stomach-tube.

H. Willoughby Gardner⁵ records a case of **hypertrophic stenosis of the pylorus** in an infant. The child was unusually healthy until 7 weeks old. At that time the mother's milk caused indigestion. Ten days later vomiting began. All kinds of food were rejected. There was rapid loss of weight with constipation; an ill-defined mass was felt in the pyloric region; and visible peristalsis of the stomach was noted. Operation was refused. Improvement began 5 weeks after the vomiting started. It seemed to be due to the almost complete rest of the pyloric sphincter when all food but whey in minute amounts had been withdrawn. The initial attacks of indigestion seemed to cause spasm of the pylorus, and, supposedly, this in turn caused the hypertrophy which could later be felt as a tumor. Freund's⁶ experience confirms this view. He has observed 6 cases of stenosis of the pylorus in infants, in 3 of which all symptoms disappeared after some decided modification of the diet. One of the children was operated on, but died of subsequent hemorrhage from jejunal ulceration. Two of the cases proved rebellious to all internal measures and died. Freund believes, therefore, that the stenosis is most probably spastic.

Cautley and Dent⁷ report 2 cases of **congenital stenosis of the**

¹ Deut. med. Woch., Bd. xxviii, No. 49.

² Arch. f. Kinderheilk., Bd. xxxv.

⁴ N. Y. Med. Jour., Jan. 24, 1903.

⁶ Mittheil. a. d. Grenzgeb. d. Med. u. Chir., June, 1903.

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³ Jahrb. f. Kinderheilk., Bd. lvi.

⁵ Lancet, Jan. 10, 1903.

⁷ Lancet, Dec. 20, 1902.

pylorus, one of which recovered after the operation of pyloroplasty. Cautley has seen 7 cases within 5 years, and notes that a fatal issue is to be expected before the fourth month in cases not operated on. Pyloroplasty is to be preferred to dilation.

John Thomson¹ believes that **defective coordination in utero** may be a factor in the causation of certain congenital malformations, such as (1) congenital hypertrophy of the bladder with dilation of the ureters and renal pelvis, with no organic obstruction; (2) congenital hypertrophy of the colon with no organic stricture; (3) congenital hypertrophy of the pylorus and wall of the stomach. In these groups of cases the muscular hypertrophy results from overexertion, probably functional in origin. Thomson suggests that the failure of coordination may follow as the result of an "intrauterine developmental neurosis."

Preisch² found a **congenital valvular closure of the duodenum** in a child 7 days old. Death resulted from hemorrhage. There was a deep, sharply defined ulcer in the gastric wall. Two valves almost completely closed the duodenum 3 inches from the pylorus. Twenty-three similar cases have been reported.

C. H. Barber³ reports a case of **multiple ulcers of the stomach** in a child of 10 years. No symptoms existed except some heaviness in the epigastrium during the days preceding death. The autopsy showed 4 ulcerated patches, 2 of which had perforated.

D. L. Edsall⁴ has found severe **acid intoxication** of the type seen in diabetes mellitus during attacks of **recurrent (cyclic) vomiting in children**. The symptoms of acid intoxication were formerly supposed to be due to the specific toxic effects of acetone; it is now believed that they are due merely to the presence of excessive amounts of acids, and are produced by reduction of the alkalinity of the body-tissues and fluids, and the loss of alkalies in the excretions, the acids carrying the alkalies off in combination with them. Acetonuria has several times been noted in cases of recurrent vomiting; this seemed from the reports to be of little consequence. Inanition of any kind and prolonged vomiting and abstinence from food are sufficient to cause acetonuria and diaceturia. Edsall has notes of 5 cases of recurrent vomiting in which marked evidences of acid intoxication were found at the beginning or during the first 24 hours of the attack. In all of these cases marked and unprecedented improvement followed the use of large doses of bicarbonate of soda. In many subsequent instances, in these patients, when acetonuria with prodromal symptoms of an attack were found, the alkaline treatment aborted such attacks; the only failure was reasonably ascribed to a too late administration of the alkali. Marfan has described a disorder which is probably identical with the recurrent vomiting of American authors. He has regularly found acetone in the urine at the beginning of these attacks. He attributes the condition to acetonemia, and calls it "vomiting with acetonemia." In the alkaline treatment the object is to render the urine decidedly alkaline within the shortest possible time, and

¹ Pediatrics, Oct. 15, 1902.

³ Brooklyn Med. Jour., Dec., 1902.

² Jahrb. f. Kinderheilk., Bd. lvii, 1903.

⁴ Am. Jour. Med. Sci., April, 1903.

to keep it alkaline until the symptoms have disappeared. One hundred grains of bicarbonate or citrate of soda, given as rapidly as possible, is probably a low limit at the start. Edsall concludes that acid intoxication will probably not explain all cases of recurrent vomiting, but suggests that it is an easy matter to determine how often it is present and how often the alkaline treatment is effectual. [Marfan appears to consider the acetonuria as the cause of the vomiting. We look upon it rather as an accompaniment. The alkaline treatment appears to constitute the best treatment for the disease, so far as our present knowledge goes.]

Alfred Hand¹ believes that **cyclic vomiting** is due to the elimination of some poison through the gastric mucous membrane. His best result in treatment was obtained with two teaspoonfuls of milk of magnesia, given as soon as the vomiting occurred and repeated every half hour until the bowels moved.

Thomas C. Ely² considers that **cyclic vomiting** is a neurosis due to toxins from faulty metabolism and faulty kidney elimination. These attacks usually occur in gouty and neurotic children and must be carefully distinguished from bilious vomiting, reflex vomiting, and the vomiting of disease. Ely advises hypodermics of morphin and atropin in severe cases, and free elimination from the intestinal tract by calomel and saline enemas. Three cases are cited.

J. L. Dumas³ considers that most of the **remittent prolonged fevers** of childhood, in which the Widal reaction is persistently absent, and Plasmodium malariæ is not found, are of **gastrointestinal origin**. Clinically they most resemble typhoid fever. Yellow fever must be considered in cases developing within the yellow-fever zone. Legrain has recently attributed them to the colon bacillus. The expression "entero-septic fever" proposed by Dr. Tomas, of Matanzas, is commonly used in Cuba.

John Lovett Morse⁴ divides the **acute diarrheas of infancy** into: (1) Simple diarrhea, resulting from sudden changes of temperature, prolonged exposure to heat or cold, fright, fatigue, or the mechanical action of undigested food; (2) infective diarrhea, the result of the activity of a variety of microorganisms; (3) fermental diarrhea, of two main varieties—acid fermentation and albuminoid decomposition; (4) ileocolitis, in which class the Shiga bacillus has been isolated; (5) cholera infantum, a term only applicable to cases with intense choleriform symptoms.

G. W. Boot⁵ classifies **diarrheas in children** as follows: (1) Mucous disease; (2) diarrheas of indigestion; (3) diarrheas due to food infection. (A) the result of preformed poisons, such as tyrotoxicon; (B) diarrheas due to bacterial and other infection, the food being the medium of infection; the poisons causing the diarrhea are elaborated within the body. (a) Intestinal tuberculosis; (b) typhoid fever; (c) amebic dysentery; (d) cholera; (e) enterocolitis due to Shiga's bacillus; (f) miscellaneous in-

¹ Proc. Phila. Co. Med. Soc., Sept., 1902.

² Jour. Am. Med. Assoc., March 28, 1903.

³ Jour. Am. Med. Assoc., March 7, 1903.

⁴ Amer. Med., May 2, 1903. ⁵ Jour. Am. Med. Assoc., June 13, 1903.

fections. [We have long believed the term "mucous disease" to be a misnomer.]

A. C. Cotton¹ believes that there is a tendency to restrict the diagnosis of **cholera infantum** to fatal cases. It seems probable that the solution to the problem lies within the domain of bacteriology.

H. D. Chapin² mentions the belief that the high infant mortality during the summer months depends on the high bacterial content of the milk; and while he grants that this has an influence, yet he believes that other factors also exist, for it does not seem probable that the variations in the mortality from summer diarrhea from year to year depend upon changes in the care of the milk, as this is practically always the same. For the country district of New York State there was a decrease of 40 % in the deaths in 1901 from those in 1900 (May to October), while in the maritime district, or Greater New York city, there was an increase of over 50 %. The fermentation in milk which seems to cause summer diarrhea is that which attacks the proteids and is set up by **spore-forming bacteria**; these are liable to be carried in **dust**, and Chapin believes that the high mortality in 1901 in New York city depended on an increase of dust in the air as a result of the extensive tearing up of the streets.

Charles G. Kerley and John L. Hughes³ believe that the large mortality from **summer diarrhea** will be done away with when infants of the poor receive clean, fresh milk preserved with ice, and when the mothers are individually instructed how to keep and prepare the food, as to the dangers of carelessness in its preparation, and what to do in the beginning of the baby's illness. The municipality should furnish clean milk and ice to those who cannot afford them.

From his experience at the Babies' Hospital, New York, Kerley⁴ finds that the most important measure in the management of **summer diarrhea** is a **change in diet**. The carbohydrates, usually in the form of barley or rice gruel, plain or dextrinized, form the best available milk substitute. Half an ounce of the raw cereal to a pint of water is the usual strength; it should be cooked for 3 hours. The wine peptone and beef preparations on the market may be used as flavoring material. Egg-albumen, beef-juice, and animal broths are not safe substitutes for milk.

McKee, Westcott, Harris, and Ostheimer⁵ discuss **summer diarrhea** of infants or milk-poisoning. The absolute withdrawal of milk from the diet and the free evacuation of the bowel even in the presence of diarrhea are insisted on. McKee⁶ believes some good may be accomplished by salol. Enteroclysis, although abused, is nevertheless of value. A cold pack is the best means to reduce temperature. Hypodermoclysis and alcoholic stimulation are occasionally valuable. Westcott⁷ withdraws milk for from 5 to 7 days and returns to ordinary diet very slowly. Harris⁸ relies mainly on bismuth in medication; strychnin, morphin, and brandy hypodermatically may be needed. He considers that normal salt

¹ Jour. Am. Med. Assoc., June 13, 1903.

² Arch. of Ped., July, 1902.

³ N. Y. Med. Jour., Nov. 22, 1902.

⁴ N. Y. Med. Jour., June 6, 1903.

⁵ Phila. Med. Jour., July 26, 1902.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid.

solution is of value to aid in eliminating the poisons. Ostheimer¹ advises gastric lavage in cases in which vomiting persists, and prefers calomel in divided doses to castor oil, when vomiting is present.

John Lovett Morse² believes in returning to a milk-diet after a few days, in cases of **fermental diarrheas** of infants (summer diarrhea), and thinks that results will be as good as from various cereal preparations and broths, provided the milk be sufficiently diluted at the start. This does not gainsay the undoubted value of temporarily omitting it.

Louis Fischer³ makes use of weakened tea with or without egg-albumen or barley-water in cases of **summer disorders** in infants when milk is not tolerated. In cases in which there is cardiac depression, he administers coffee made with barley- or rice-water. Fischer⁴ also describes the preparation of almond milk, which he considers as an efficient substitute for cows' milk during acute intestinal disorders. One or 2 ounces of sweetened almonds is scalded and the skins removed. These are mashed to a pulp in 8 ounces of water, boiled for 20 minutes, strained, and enough water added to make 1 pint. It can be sweetened with 1 tablespoonful of sugar. Fischer often uses it in place of cereal decoctions. Mashed peas boiled with beef, chicken, or veal offer a nutritious protein substitute for milk.

Thomas D. Parke⁵ has **withheld all food but water** for respectively 5 and 8 days in 2 cases of ileocolitis. While admitting that much shorter periods of deprivation are sufficient and, at times, necessary, Parke contends that severe cases of intestinal disease will be more comfortable [?] and will recover more quickly on water than on any food that a disturbed intestinal tract cannot assimilate.

J. H. M. Knox and Louis M. Warfield⁶ from a study of the **leukocytes in summer diarrhea** find: (1) A relative increase in the small mononuclear and a decrease in the polymorphonuclear cells in children under two years of age. (2) There is usually a leukocytosis in summer diarrhea, but it is not constant enough to be of diagnostic value. (3) In simple dyspepsias a differential count does not show marked changes, but as the cases become more severe there is an increase in the polymorphonuclear elements, and a decrease in the small mononuclear, approaching normal adult blood. (4) As shown by Japha, polymorphonuclear leukocytosis is an indication of intoxication due to intestinal putrefaction, or of toxins from pathogenic bacteria. This occurs in both acute intestinal poisoning and in severe forms of ileocolitis. (5) In simple atrophy we find a normal differential leukocyte count, but an increase in the polymorphonuclear cells may indicate an inflammatory intestinal complication.

F. Forchheimer⁷ reported a case of **acute appendicitis** developing 3 days after the onset of **amygdalitis**. He explained this by the fact that the appendix is a locus minoris resistentiae for bacteria which gain entrance to the circulation through the inflamed tonsil. In view of recent bacteriologic investigations, it seems proper to conclude that bacteria are

¹ Ibid.

² Amer. Med., May 2, 1903.

³ Med. Rec., Aug. 2, 1902.

⁴ Ibid., 1902.

⁵ Jour. Am. Med. Assoc., June 20, 1903.

⁶ Bull. Johns Hopkins Hosp., July, 1902.

⁷ Arch. of Ped., Sept., 1902.

taken up by the tonsils, and strong clinical proof is furnished by the fact that amygdalitis of any sort is always followed by enlargement of neighboring glands. Forchheimer also reported 5 cases of **jaundice following an injection of the tonsils**, within a period of from 3 to 10 days. Three of the cases occurred in one family. The first symptoms of the hepatic attack were epigastric pain and vomiting with moderate fever followed by slight icterus, bile coloring-matter in the urine, clay-colored stools, pruritus, slight drowsiness, etc. The region of the liver was sensitive, the gallbladder not full, and the spleen was enlarged in 3 cases. The jaundice lasted from 3 to 5 weeks; albuminuria was not found, and cultures from the stools were negative for pathogenic organisms. All of the patients recovered. The mechanism of the production of such cases of infectious jaundice (so-called Weil's disease) is not well understood. Jaundice itself may be produced as the result of the introduction into the circulation of certain toxic bodies, such as phosphorus and santonin. It has not been shown experimentally that the bacterial toxins produce jaundice. For bacterial causation there is more evidence. For example, cases of icterus in connection with influenza, typhoid fever, catarrhal respiratory affections, cholera, and other acute infectious diseases have been reported. Experimental evidence shows that bacteria which are injected into the blood are eliminated by the liver and kidneys. Whether they produce jaundice by obstruction of the interlobular bile-duets or by causing a cholecystitis, or in other ways, is of secondary importance to the fact that the jaundice results from the infection of the blood. In a more remote way, jaundice may be produced by infection from a gastro-duodenitis, although at the present time there is a tendency to minimize the possibility of its production in this manner.

Stooss¹ reports 4 cases of **pneumococcus peritonitis**. All of them were suppurative processes; 1 was diffuse, and 3 were circumscribed. After careful study he concludes that the disease may be conveyed by contiguity, from the intestine, the pleura, or the female genitalia, and also through the blood. In the circumscribed form the prognosis is good.

M. Huber and J. N. Erdmann² report a case of **intussusception**, in a male infant 8½ months old, following a mild diarrhea. Reduction was attempted by an enema of water, with abdominal manipulation. This was followed by disappearance of the tumor, but as no feces were discharged, laparotomy was performed, and the intussusception found still existent. It comprised the cecum, appendix, and 2 inches of the ileum. After reduction the nearly gangrenous appendix was removed; a large congested mesenteric lymph-node was noticed on the ileocecal valve; a secondary enteritis was followed by recovery in about 2 weeks. Huber refers to the rarity of fecal vomiting in infants, to the characteristic discharges of bloody mucus resembling currant jelly, and to the paroxysmal nature of the colic. In the surgical comments Erdmann decries the use of injections after 12 hours from the onset, attributing rupture of the serous coat of the intestine, which he has frequently seen, to the forced

¹ Jahrb. f. Kinderheilk., Bd. lvi.

² Arch. of Ped., July, 1902.

distention by water or air. He warns against trying to reduce by pulling on the entering portion, the only safe method being by pressure at the apex. If adhesions exist, they may be broken up with a blunt instrument.

J. N. Hall¹ records a case of **congenital dilation of the small intestine** in an infant 11 months old. The child had been constipated since birth, but with the exception of an enormously distended abdomen showed no gross abnormality in development or nutrition. It died of progressive asthenia. At autopsy the first 2 inches of the small intestine were found to be only $\frac{2}{5}$ of an inch in diameter. Abruptly at this point the intestine was dilated to a diameter of $1\frac{1}{4}$ to $1\frac{1}{2}$ inches, continuing at this size until near the ileocecal junction. The mucosa showed deep reddish-brown congestion, but was of normal thickness. The stomach and large intestine were normal. The distention was caused by gas, with a small amount of yellowish semisolid feces. No ulceration or constriction was found. Hall concludes that death was caused by auto-intoxication from retention of feces.

Benzian Skormin² differentiates the usual benign **icterus neonatorum** from the **other forms of icterus** in infants by the time of their appearance, and by the presence or absence of soluble biliary coloring-matter in the urine. The former occurs in the first days of life, and the urine is free from biliary coloring-matter in solution, using Gmelin's test. In nearly all other forms of icterus Gmelin's test shows the presence of soluble biliary coloring-matter. He classifies the other forms of icterus as follows: (2) Septic icterus; (3) afebrile cyanotic icterus with hemoglobinuria (Winckel's disease); (4) infectious icterus of newborn originating in the gastrointestinal tract; (5) icterus following extravasations of blood; (6) catarrhal icterus; (7) toxic icterus; (8) icterus brought about through acute atrophy of the liver; (9 a) icterus caused by congenital defect or congenital obliteration of the bile-duets; congenital cirrhosis of the liver; (b) icterus caused by congenital growths in the portal space or around the portal vein.

John Lovett Morse³ reviews the subject of **cirrhosis of the liver in childhood**. The type is usually hypertrophic, owing possibly to the great vitality of the hepatic cell in childhood, atrophy occurring less readily than in the adult; or to the fact that the patients die in the early stages. All the causes of cirrhosis in the adult are seen in children, and, in addition, congenital obliteration of the bile-duets and congenital syphilis. Alcohol is responsible for from 10 % to 25 % of the cases. In about 60 % there is no evident cause. Morse considers that the eruptive fevers rarely, if ever, produce hepatic cirrhosis. The toxins of these diseases affect especially the hepatic cell, which may degenerate or proliferate; but the changes rarely persist and then only in small cicatricial areas which do not deserve the name of cirrhosis. Syphilitic cirrhosis usually takes the form of diffuse interstitial hepatitis; gummata are rare, and if they occur are usually scattered miliary granules. The spleen is

¹ Arch. of Ped., Jan., 1903.

² Jahrb. f. Kinderheilk., Bd. Ivi.

³ Boston M. and S. Jour., Sept. 11, 1902.

always enlarged. Many cases of tuberculous cirrhosis have been described either as a miliary tuberculosis, or with actual tuberculous involvement of the liver, in which case the process develops in connection with tuberculosis elsewhere. Pericardial obliteration is more common in childhood than in adult life; in both it may lead to cirrhosis. The spleen is also enlarged. Infection of enteric origin probably plays a part in this, as well as passive congestion. Over 70 cases are recorded of cirrhosis in connection with congenital occlusion of the bile-ducts. The liver is usually enlarged, and the spleen much enlarged. Death often occurs from hemorrhage. No case has lived longer than 8 months. The nature of the lesions in the bile-ducts points rather to a chronic inflammatory process than to an arrest in development. In either supposition the changes in the liver must be dependent on obliteration of the larger ducts, in which case the lesions in them should be older than those in the liver. In some cases they have been; in others, not. Moreover, the larger ducts have been found patent. The explanation for this may be that the irritants pass through the placenta to the fetus, setting up a cirrhosis and a cholangitis which descends to the larger ducts.

Among 9000 children admitted to the Louise Hospital at Copenhagen in 24 years Schiödte¹ has found **43 cases of tapeworm**, eleven of which were recurrences. *Tænia mediocanellata* predominated. Treatment was not invariably successful. Only 65 % of those with *Tænia mediocanellata* were completely cured. The general health of the patient suffered much from the presence of the parasite and also from the course of treatment. Some of the children were much emaciated, and nearly all exhibited pallor of the skin and mucosas, with slight anemia, possibly due to toxins secreted by the parasite.

Henry E. Tuley² thinks that the temperature of infants during the first week after birth should be taken at least twice daily, for the detection of **inanition fever**.

Essential or toxemic dropsy is discussed by Acker.³ It usually occurs in feeble anemic children suffering from gastrointestinal disorders, to which it is secondary. The kidneys are normal, examination of the urine is negative, and the heart and lungs are as a rule in good condition. Treatment must be in the main dietetic and tonic.

DISEASES OF THE RESPIRATORY TRACT.

The fact that certain diseases of the respiratory tract occur at definite periods of the child's life leads Gregor⁴ to suppose that they bear a definite relation to the orderly development of the **mechanics of respiration** in the child and to the disturbances of the same. In pathologic cases the departure from the normal course of development shows itself during the second half of the first year as a slight diminution of the depth of respiration. This in turn impairs the normal tendency in later childhood to compensate for increased muscular work by slow and deep breathing.

¹ Hospitalstidende, No. 49 u. 50.
³ Am. Jour. of Obstet., xlvi, 1902.

² Jour. Am. Med. Assoc., June 13, 1903.
⁴ Jahrb. f. Kinderheilk., Bd. lvi.

Ballenger¹ says that, as a result of **mouth-breathing**, the bronchi and vesicles lose to an extent their activity in absorbing oxygen and throwing off carbon dioxid. Deficient oxygenation, with the resulting toxic products in the circulation, produces certain nervous phenomena and malnutrition. Accumulation of carbon dioxid in the blood impairs the functions of the leukocytes and other cellular tissues which are unable to aid in eliminating the products of faulty metabolism—thus increasing the nervous phenomena.

Lemonnier² finds that **asthma in children** is frequently overlooked. It is most commonly confounded with bronchopneumonia. The paroxysms occur most frequently during the day. The respirations are gradually increased in number; possibly to this fact many errors of diagnosis are due. Sonorous rales without dyspnea, lasting 2 days at a time and returning periodically, are suggestive.

Thomas S. Southworth³ reports a case of **acute pulmonary edema** which was treated by suspending the child head downward and making stroking pressure from the bronchi toward the head. This resulted in the discharge of frothy mucus from the nose and mouth and gave immediate and marked relief. In the absence of other ascertainable cause the attack was supposed to be due to acute indigestion.

Caillé⁴ advises enteroclysis for early stimulation in **croupous pneumonia**. The kidneys are stimulated and the elimination of septic products promoted, besides furnishing the system with water which is much needed.

Olimpio Cozzolino⁵ reports a case of **lobar pneumonia simulating appendicitis** in a girl 14 years of age. There were present fever, rapid pulse and respiration with marked abdominal pain and localized tenderness at McBurney's point, but without increased local resistance. On this point alone was appendicitis excluded, as the physical signs in the lungs were negative until the following day.

Lobar pneumonia⁶ in infancy is much more frequent than is supposed, according to William F. Cheyney. The onset is rather obscure. The temperature and respirations are increased, there is the typical expiratory moan or grunt, and a suppressed cough. The physical signs are in the main auscultatory. To be noted are the intensity and quality of the breath-sounds, the relative length of inspiration and expiration, and, most important, the presence of clicking or crackling (metallic) rales at the close of inspiration. The prognosis is usually good. In treatment, the main indications are to avoid doing harm, and to stimulate if needed; bathing should take the place of antipyretics. For the post-critical collapse a hot bath should be given.

M. Pfaundler⁷ found the knee-jerks partially or totally lost in 55 out of 200 cases of **croupous pneumonia**. In other varieties of pneumonia the knee-jerks were normal. The loss of reflex often preceded the physi-

¹ Ann. of Otol., Rhinol., and Laryng., Aug., 1902.

² Thèse de Paris, 1902.

⁴ The Post-graduate, July, 1902.

⁶ Amer. Med., July 26, 1902.

³ Med. Rec., April 18, 1903.

⁵ N. Y. Med. Jour., March 7, 1903.

⁷ Münch. med. Woch., July 22, 1902.

cal signs in the lung, and in cases showing initial cerebral symptoms was especially marked. Acetonuria was found in 50 % of all cases, the diazo-reaction in 15 %, herpes labialis in 18 %. The mortality of the 55 cases was 5.4 %. Pfaundler thinks the loss of knee-jerk may help to differentiate croupous pneumonia from incipient meningitis.

Phillip F. Barbour¹ believes that no other term conveys exactly the same impression as **capillary bronchitis**. Given a case of bronchitis in which the rales become finer and finer, the breathing more and more labored, until there is alarming dyspnea, the child struggling for breath, its color becoming darker, the nose and ears cold, we find a different picture from that of bronchopneumonia. [We have always believed that there is no such entity as "capillary bronchitis," and that the term should be finally abandoned.]

Charles G. Kerley² finds that **counterirritation** is a serviceable measure in case of **bronchopneumonia** where there is a great deal of bronchial catarrh—which, of course, usually obtains. He prefers the old-fashioned mustard plaster, 1 part of mustard to 2 parts of flour, repeated every 6 to 8 hours in severe cases. It should not be removed until there is a distinct irritation of the skin.

Nobécourt and Voisin³ performed **lumbar puncture** in 31 cases of **bronchopneumonia**. The cerebrospinal fluid is usually limpid, very plentiful, and contains a trace of albumen, in cases complicated by meningeal symptoms. A moderate number of leukocytes (lymphocytes and even polynuclear forms) was present. Pneumococci were found twice. Lumbar puncture has slight clinical and prognostic value in most cases.

Joseph O'Malley⁴ was led accidentally to use **diphtheria antitoxin** in a **bronchopneumonia** complicating influenza. He has since employed it repeatedly in the pneumonias complicating the exanthems with uniformly satisfactory results.

John Lindsay Steven⁵ reports the **bacteriologic findings** in 2 fatal cases of **bronchopneumonia**. In both cases the spleen yielded a pure culture of Fraenkel's pneumococcus; inflammatory exudate from the pleura and pericardium in one case yielded cultures of pneumococcus and of *Bacillus coli communis*. Pus from the bronchial tubes in the second case contained pneumococci and tubercle bacilli. Allowing for mistakes in technic, the presence of colon bacilli is suggestive in view of the association of bronchopneumonia and gastrointestinal catarrh. The presence of tubercle bacilli is of the greatest interest in its bearing on the well-known tendency of such cases to terminate in pulmonary tuberculosis. After a careful consideration of acute infantile bronchopneumonias Steven believes the name "pneumonia" to be misleading; the term "acute infantile bronchopneumonitis" would be a more correct designation, and less liable to be confounded with lobar pneumonia, with its distinctly different pathologic findings. [We see no advantage in the term recommended.]

¹ Jour. Am. Med. Assoc., June 20, 1903.

² Jour. Am. Med. Assoc., June 20, 1903.

⁴ Amer. Med., Jan. 17, 1903.

³ Rev. Mens. d. Mal. d. Enf., xxi.

⁵ Lancet, Sept. 20, 1902.

A. Jacobi¹ discusses the neglected subject of **peribronchitis and interstitial pneumonia**. During the acute stage this process may be indistinguishable from a typical lobar or lobular pneumonia. As a rule, however, the temperature in interstitial pneumonia is moderate and is protracted for weeks or months; 101° to 102° F. may be reached at night, with morning remissions. Such cases may be mistaken for typhoid fever, tuberculosis, or intestinal auto-intoxication. In the later stages, when induration is fully established, there is no temperature. Interstitial pneumonia, if progressive, results in retracted lung, deformities of the chest, vicarious emphysema, bronchiectasis, and occasionally in abscesses or firm indurations, or even osseous deposits. Many cases remain indolent and innocuous in the first stages. It is to these Jacobi draws especial attention. The physical signs on percussion are those of increased density of the lung. On auscultation the respiration is strongly puerile in the young; there may be bronchitic rales for short periods in acute cases, rarely in the chronic stages. With connective-tissue hyperplasia the respiratory murmur becomes feeble. When atrophy has occurred, or even before this, the breathing becomes of bronchial quality; this is especially marked on expiration. These signs are permanent. In many cases the inspiration is interrupted (cog-wheel)—often without the presence of pleural adhesions. Secondary emphysema and cavities yield their usual signs. Jacobi emphasizes the absence of cough; even many of the acute cases do not have it. Harassing cough is present only in those cases in which there are early intense complications or in which secondary processes of fibrous degeneration occur. The heart may be displaced from adhesions; in all cases the heart-sounds are transmitted to a great distance, as in any solidification of pulmonary tissue. Deformities of the chest occur when the induration is of sufficient extent. In diagnosis certain points are of importance. Interstitial pneumonia usually affects an upper lobe—mainly the right. Tuberculosis is most often found in this locality, but the left upper lobe is also usually affected; in children it is more apt to spread over all the lobes. Tuberculosis of the lungs is always attended by cough and rales are present; as a rule these are absent in interstitial pneumonia. The two processes may be associated; if this is the case, the more the interstitial proliferation predominates, the better the chances for recovery. Pleurisy is usually found over a lower lobe. Pleurisy with effusion is usually found over a lower lobe posteriorly. Tuberculous pleurisy soon spreads over the entire pleura of one side. The interstitial process is often dependent on pleuritis, but frequently originates in the interior of the lung and leaves the pleura intact. Treatment, to be preventive, should be resorted to in infancy and childhood. Plenty of good air and good food, lukewarm or cool sponging in the morning are to be advised, always guided by the strength, and weight, and previous habits of the patient. In hospital practice infants should be removed as soon as possible after recovery from the disease for which they were admitted. An infant should not be fed exclusively on milk too long; animal foods and cereals are indis-

¹ Arch. of Ped., Jan., 1903.

pensable. Medicinally, Jacobi makes use of arsenic, phosphorus, and digitalis; the possibility of syphilis must not be forgotten. The temperature rarely requires as much attention as circulation and nutrition. Frequent and protracted bathing at 90° to 95° F. has a good effect. Iodin as a resolvent should be given early and persistently. Chronic dormant cases require pulmonary gymnastics, always under medical supervision, as cases have been known to recur from overzealous efforts in this direction. [This description seems to bear some relation to the conditions described by Douglas Powell in "Diseases of the Lungs and Pleuræ" as alveolar catarrh. Illustrative cases were reported in "Pediatrics," vol. ix, No. 2.]

P. Stanley Baker¹ divides **empyemas** in children into acute or primary and late or secondary groups. In the acute cases signs of fluid in the chest develop simultaneously with those of pneumonia. The mortality is high. Practically all cases under 2 years of age succumb. In the late cases signs of fluid develop days or even weeks after the initial attack of pneumonia. These are examples of a pure and simple empyema. In the acute cases the lung is still more or less consolidated when pus forms in the pleural cavity.

David Bóvaïrd, Jr.,² lays emphasis on the following points in the **pathology of empyema** in infants and children: (1) Its frequency; (2) the frequency of bilateral cases; (3) the impossibility of drawing a sharp distinction between serofibrinous pleurisy and empyema; (4) the creamy consistency of the exudate in many cases; (5) the frequency of sacculated effusions; (6) the frequency of pneumonia, especially bronchopneumonia, as a preceding or accompanying lesion. The pneumococcus is present in the great majority of cases, especially in thick creamy exudates. The streptococcus or staphylococcus is found in a much smaller percentage of cases, especially in those unassociated with pneumonia and characterized by thin purulent exudates. Tuberculosis is present in but a small percentage of cases (6 % in his series of 101 cases).

Cotton,³ from a study of 180 cases of **empyema** in children under 12 years, concludes that it usually follows lobar pneumonia and is due to pneumococcus infection. He advocates the early resection of a rib in the posterior axillary line and use of a **drainage tube**. Irrigation is not usually advisable. In the more chronic cases treatment by negative pressure helped to expand the lung. The suction apparatus used is described, also a gutta-percha tissue valve dressing which rendered good service.

Henry Koplik⁴ makes the following observations on the **physical signs of empyema in infants**: The pleural cavity may be full of fluid and still the voice and breathing will be normal on auscultation or only slightly diminished in intensity, anteriorly and posteriorly; bronchophony and bronchial breathing with pleuritic rales may be heard over the side of the chest which is the seat of effusion. Of the greatest utility are the percussion-note, the fremitus, and the displacement of viscera. The per-

¹ Brit. Med. Jour., May 23, 1903.

² Med. News, Sept. 13, 1903.

³ Boston M. and S. Jour., July 17, 1902.

⁴ Med. News, Sept. 13, 1902.

cussion-note is flat over the whole side posteriorly; anteriorly there may be skodaic resonance. In most cases fremitus is absent or diminished if the infant cries. On the left side the displacement of the heart and on the right side that of the liver are of confirmatory evidence. The diagnosis of fluid over the upper lobes and lower lobes anteriorly must be made with reserve, without corresponding signs behind. No diagnosis is complete without exploratory puncture of the chest.

DISEASES OF THE HEART AND BLOODVESSELS.

Cassel¹ has studied 107 cases of **cardiac disease** in children. He finds the first 5 years of life are less subject to these affections than the next 5 and the remainder of childhood. In 26 cases of congenital heart-disease cyanosis was present 17 times, clubbing of the fingers 9 times, systolic murmurs 20 times, enlarged heart 11 times, failure of general development 5 times. Systolic murmur and cyanosis are not necessarily present in these cases. A large number (70) of cases of vulvovaginitis in children were studied, but in none was there any signs of endocarditis.

John Thomson,² as a rule, prefers animal to vegetable food for ambulant cases of **chronic valvular disease** or enlargement of the heart in children. Only stale or toasted bread should be eaten, and sweets should be almost entirely omitted. They tend to produce flatulence and so excite the heart-action. The meals should be eaten slowly and at regular intervals. The heavy meal should be given at noon.

Geo. M. Swift³ considers that enlargement of the liver, a turbulent action of the heart with a diffuse area of cardiac impulse, or a drawing-in of the intercostal spaces during systole, are among the most important diagnostic signs of **adherent pericardium**. Murmurs without valvular lesions can be explained by the way in which the heart is held by adhesions. Cardiac stimulants are likely to have a bad effect.

A. E. Sansom⁴ describes four varieties of the **rheumatic heart** in children: (1) The temporarily swollen or enlarged heart of rheumatism; (2) the heart of rheumatic pericarditis; (3) the heart of rheumatic endocarditis with resulting valvular disease; (4) slow, insidious endocarditis inducing mitral stenosis. Enlargement of the heart is fairly common, but the organ recovers its normal size in a large proportion of cases unless the disease within the heart increases, as often happens, either from endocarditis or pericarditis, or both. Even in mitral regurgitation, a certain amount of dilation is a good thing to insure compensation. Sansom is therefore of the opinion that the evil significance of dilated heart has been somewhat overestimated.

Enteroclysis carried out with Kemp's flexible double-current catheter (15 minutes' flow of water at 110° F.) appears to be an absolutely safe and efficient method of combating **circulatory failure** in septic conditions, according to Augustus Caillé.⁵ Circulatory failure is not always

¹ Zeit. f. klin. Med., Bd. xlvi, 1903.

² Jour. Am. Med. Assoc., April 25, 1903.

⁴ Lancet, Aug. 23, 1902.

³ Med. Rec., Nov. 29, 1902.

⁵ Arch. of Ped., March, 1903.

heart-failure. Jacobi¹ thinks that the **stimulating** effect on the splanchnic nerves by the **heat** plus the fluid which is absorbed adds blood to the circulatory medium, and thus explains in part the rapid effect produced.

George Carpenter² reports 4 cases of **myocarditis** in children. The first, a girl of 6 years, had been ill 1 month with enlarged glands, epigastric pain, and loss of weight. On admission to the Evelina Hospital there were noted cyanosis, enlarged area of cardiac dulness with enlarged and pulsating liver, a whistling systolic mitral murmur, a systolic thrill, and subnormal temperature. Two months later she left the hospital with a "sound" heart. The second patient, a girl of 9 years, was admitted to the hospital for swelling of the abdomen and dyspnea. The temperature was normal; the heart and liver were enlarged. She suffered from attacks of dyspnea, but no thrill or murmur was detected. Nine days later she died suddenly. Autopsy showed interstitial myocarditis with a normal endocardium, and marked dilation. The third case, a girl of 8, was admitted with subacute rheumatism and a history of recent chorea. There were moderate temperature, enlargement of the heart and liver, edema of the ankles; systolic and presystolic murmurs were heard and a distinct systolic thrill felt in the fourth left intercostal space. At autopsy the heart was found to be enlarged, and its walls studded with areas of myocarditis, but the pericardium and endocardium were normal. No note is made of the examination of the heart of the fourth case during life. At autopsy focal myocarditis was found.

According to these cases, it would appear that the mitral murmur merely requires for its production a leaking valve; that a roughness or irregularity of the segments is not necessary to that end, and that a mitral murmur is not diagnostic of endocarditis, though it is of mitral insufficiency; that the presystolic and diastolic mitral murmurs are indicative of a disturbance of the normal relationship that exists between the size of the mitral orifice and the left auricle; that when the auricle is distended and the orifice distorted there may be a comparative narrowing of the orifice—in other words, a comparative mitral stenosis for that particular heart; and that these murmurs are clinically indistinguishable from the murmurs of ordinary mitral disease. When murmurs are present, however, they are more apt to be true endocardial murmurs than the reverse, by reason of their greater comparative frequency in heart-disease, with the reservation that mitral stenosis in childhood is a rarity. Carpenter has also heard murmurs produced by adherent pericardium, and in combined pericarditis and myocarditis, when the endocardium was normal. He believes that such pathologic conditions as have been described will explain some of the vanishing murmurs after rheumatism and chorea, together with the undue rapidity and irregularity of the heart's action in some cases of the latter.

Zuppinger³ reports 2 cases of **diffuse chronic myocarditis** in children, with the pathologic findings.

¹ Arch. of Ped., March, 1903.

² Lancet, May 30, 1903.

³ Arch. f. Kinderheilk., Bd. xxxv.

Variot¹ describes a case of **congenital cyanosis** due to a defective ventricular septum and stenosis of the pulmonary artery, in which no abnormal cardiac sounds were heard. Death occurred at the age of 16 months.

DISEASES OF THE BLOOD.

M. Bellotti² has observed that certain infants, **after vaccination**, develop a pallor of the skin and mucous membranes, which persists for months, the patients having been previously of healthy color and free from disease. No blood-examinations were made, but Bellotti considers the condition akin to **anemia** observed in variola.

W. C. Hollopeter³ considers that caries of the milk teeth, nasal stenosis and mouth-breathing, and eye-strain are the most frequently overlooked causes of anemia in childhood.

Manari⁴ reports 2 cases of **chlorosis** in boys aged 16 and 13 years, the symptoms being classic and the administration of iron being followed by recovery.

Karnizki⁵ studied the blood of 38 infants and 62 children, who were considered healthy. The average number of **leukocytes** in the first year varied from 12,000 to 13,000; from 1 to 6 years, 9415; and from 6 to 15 years, 7900. Many valuable data are given as to the relative number and morphology of the different forms of leukocytes.

Baginsky⁶ reports the case of a boy 5 years old with **diphtheria** and a tendency to hemorrhage. Injections of **10 % gelatin** were used to check severe epistaxis, successfully and without harm. In a baby 3 days old the same injection failed to relieve.

H. Fuhrman⁷ reports 3 cases of **melena neonatorum** treated with **2 % gelatin** injections, with 1 death. E. Fuhrmann⁸ obtained like results in treating 3 cases. He recommends the following formula: Gelatinæ albæ, 1.0; sodæ chloridæ pur., 0.3; aq. dest., ad 50.0. Not less than 40 or 50 cc. of such a **2 %** solution should be used for one injection. [Too much stress cannot be laid on the importance of repeated thorough sterilization of the gelatin solution intended for subcutaneous injection. Fatal results may otherwise follow.]

Charles Herrman⁹ reports a case of **paroxysmal hemoglobinuria** in a boy 4 years old, the subject of congenital syphilis. About 50 % of the reported cases in children are syphilitic. Improvement followed mixed treatment. The serum from the patient showed hemolytic action on the author's red corpuscles. It seems probable that the syphilitic poison may produce in the plasma substances which under certain conditions have a hemolytic action. As contraction of the cutaneous blood-vessels (as from cold) is probably an important cause of the attack, hot mustard baths with friction seem to be indicated. Chvostek aborted an attack with inhalations of amyl nitrate.

¹ Le Progrès méd., No. 27, July 5, 1902.

² Jour. Am. Med. Assoc., Jan. 31, 1903.

³ Arch. f. Kinderheilk., Bd. xxxvi.

⁴ Arch. f. Kinderheilk., Bd. xxvii, p. 173.

⁵ Münch. med. Woch., Sept. 2, 1902.

⁶ Münch. med. Woch., Sept. 2, 1902.

⁷ Gaz. degli Osped., May 10, 1903.

⁸ Gaz. degli Osped., Jan. 26, 1902.

⁹ Münch. med. Woch., Sept. 2, 1902.

¹⁰ Arch. of Ped., Feb., 1903.

Isaac A. Abt¹ reports 13 cases of **spontaneous hemorrhage** in the newborn, with 9 deaths. Of the 4 recoveries, 2 improved on specific treatment, 1 on 2 % gelatin injections, and 1 on local treatment of a septic otitis media. Two of the 13 cases were undoubted examples of colon bacillus infection; 1 case was probably due to a septic middle-ear disease. One case was undoubtedly due to syphilis, and in 2 there was a strong suspicion of this disease. Abt concludes that a certain proportion of cases are due to sepsis; that syphilis is another important causative factor. Further research should be directed along the line of histologic examination of minute bloodvessels contemplating also conditions governing the clotting of blood.

Zuppinger² advises the use of 2 % sterilized gelatin solution in the **treatment of purpura**, and in severe cases 5 %, sterilized for 5 successive days at 100° C. (steam). Normal salt solution must be used in preparing the solution. He reports 1 case successfully treated.

A solution of **calcium chlorid** (30 grains to the ounce) locally applied quickly checked a persistent and alarming hemorrhage from the gums in a case of **hemophilia** reported by T. Wilson Parry.³

H. L. Gordon⁴ describes an attack of **purpura rheumatica** in a boy of 14 years. Later the patient developed colic and intestinal hemorrhages, followed by unusual attacks of severe pains in the joints with a variety of skin eruptions—simple erythema and purpura, urticaria, erythema exudativum, nodules and enormous papules in endless succession. The illness lasted 5 months, finally ending in recovery.

Mlle. Kolassowa⁵ found that the blood-pressure of healthy children varies, increasing gradually with the child's age. From 1 to 2 years, the pressure averages from 80 to 85 mm.; from 3 to 4 years, 85 mm.; from 5 to 7 years, from 90 to 95 mm.; from 8 to 10 years, from 95 to 100 mm.; from 11 to 13 years, from 100 to 110 mm. In diphtheria a fall of pressure shows marked intoxication. Gärtner's chronometer was used.

Henry W. Cook⁶ makes use of a modification of the Riva-Rocci sphygmomanometer in determining **blood-pressure in children**. Preliminary investigations on healthy children (50 cases) gave the following averages: During the first few months of life the pressure averages about 70 to 75 mm.; from 6 to 12 months, 80 to 85 mm.; from 1 to 2 years, 80 to 90 mm.; in the third year, 90 to 100 mm.; from 3 to 10 years, 95 to 115 mm; 85 mm. should be considered moderately low during the period; 75 mm. low, and 65 mm. very low. All observations were made with the child reclining. A physiologic rise in blood-pressure of from 5 to 10 mm. follows the taking of nourishment (5 to 8 ounces of milk by bottle). Crying, restlessness, or excitement will often cause a rise of from 5 to 10 mm. in a healthy infant. In sick cases, such as pneumonia, marasmus, etc., strychnin $\frac{1}{200}$ gr. hypodermatically caused a rise of from 10 to 30 mm. in 10 to 20 minutes, and lasted on an average from 6 to 8 hours. Digitalin in like doses seemed to have more imme-

¹ Jour. Am. Med. Assoc., Jan. 31, 1903.

² Lancet, Feb. 21, 1903.

³ Arch. d. Méd. d. Enf., v, 1902.

⁴ Jahrb. f. Kinderheilk., Bd. Ivi.

⁵ Lancet, Feb. 14, 1903.

⁶ Am. Jour. Med. Sci., March, 1903.

diate and more sure action, and caused a higher rise, which was maintained for a shorter time. The effects of alcohol were not uniform; the best results were from repeated doses. A brief rise, or no rise after sufficient doses of strychnin and digitalin, seemed to justify a bad prognosis. In cases of delirium cordis with high pressure, digitalin steadied the heart without increasing pressure. Normal saline infusions seemed to raise pressure merely by the shock of the needle puncture; in some cases there was a slight fall. Its good effects were apparently due to other causes. Hot mustard baths and rubbing with hot alcohol seemed to be beneficial in collapse with cyanosis. Cook believes that routine blood-pressure records kept by chart are of decided value in determining the need of, or contraindication to, stimulation. Any trained nurse or other intelligent person can easily be taught the use of the sphygmomanometer.

Emile Weil and A. Clerc¹ differentiate **splenic anemia** into separate groups. The most important they designate as chronic splenomegaly with anemia and myelemia, corresponding to von Jaksch's anæmia splenica pseudoleukæmica. Another less known group of cases deserves the name of chronic splenomegaly with anemia and lymphocytæmia. These two affections, related, the latter to lymphatic leukemia, the former to myelogenic leukemia, are found in adult life as well as in infancy, but their clinical characteristics require separate classification. The authors observed 2 cases of chronic splenomegaly. They consider the presence of neutrophile myelocytes in variable number characteristic of the disease. The autopsy of one case showed marked hyperplasia of the blood-making organs. The spleen, the marrow, and the thymus gland showed marked myeloid degeneration. A small number of myelocytes and nucleated red corpuscles were found in the lymphatic ganglia. While a certain number of these cases show rachitic lesions, and a few of them suffer from hereditary syphilis, the authors do not consider that rickets is an etiologic factor in the production of splenic anemia, but include some cases of splenomegaly with myelemia in the group of parasyphilitic affections.

From a critical analysis of 22 cases of **chronic splenic enlargement with anemia** John Lovett Morse² concludes that the enlargement of the spleen, liver, and lymph-nodes develop independently of each other, and that they are not directly connected, either as cause or effect, with the changes in the blood; that there is nothing characteristic about the blood-changes found in association with enlargement of the spleen, as similar changes occur without such enlargement. It seems probable that both are dependent upon a common cause—namely, disturbance of nutrition. The two most commonly concurrent conditions in these cases are rickets and gastrointestinal disorders. Morse found the former in all but 2 of his cases; the latter, in every one. Why disturbances of nutrition cause in one case rickets, in another atrophy, and in another anemia, or enlargement of the lymph-nodes or spleen, is not known. He considers that there is no justification for placing the cases of anemia in

¹ Rev. Mens. d. Mal. de l'Enf., Jan., 1903.

² Boston M. and S. Jour., May 28, 1903.

infancy associated with enlarged liver or spleen in a class by themselves and calling them "anæmia infantum pseudoleukæmica" or "splenic anemia of infancy." J. S. Fowler,¹ on the other hand, considers that **splenic anemia of infants** (pseudoleukemic anemia of von Jakob) is a distinct and important primary blood disorder of infancy rather than a secondary anemia. From his careful analysis of 20 cases he draws the following conclusions: (1) Enlarged spleen, often associated with anemia, is not uncommon among infants. (2) The name pseudoleukemia anemia has been given to more severe cases, but it is entirely arbitrary to draw any hard-and-fast lines between these and the slighter ones or to introduce further subdivisions based on any particular blood-change. (3) The change in the blood differs from that in any other disease and is characterized by (a) lymphocytosis of numerous transitional and probably immature mononuclear cells and (b) the presence of erythroblasts, often in numbers out of all proportion to the oligocytopenia. (4) Since the splenic enlargement is more constant than any single change in the blood, and since both arise independently of any other disease, it is not justifiable to regard this affection as a secondary anemia. (5) The clinical features are sufficiently definite to warrant this being looked upon as a primary disease, to which the name splenic anemia of infancy may be given. Taking the clinical condition as a whole, we may regard it as having certain analogies to chlorosis. Both are diseases of a particular epoch in life; in neither is any definite cause known, and in both, while severe cases show a characteristic blood-change, slighter and convalescent cases pass insensibly into a normal condition. Rickets is by far the most common antecedent of splenic anemia of infancy, but genuine cases do occur apart from rickets.

Francesco Sarcinelli² describes a new method of **percussing the spleen** in children. He finds that the ordinary method defines only that portion of the spleen which is uncovered by lung, so he has the child suspended in a position midway between dorsal decubitus and the left lateral position, one arm of the attendant being placed under the child's left shoulder, the other under the pelvis. This permits the spleen to sink by the force of gravity toward the abdominal parietes. Percussion should be performed from below upward.

CONSTITUTIONAL DISEASES.

Floyd M. Crandall³ calls attention to the frequent distribution through months, and even years, of **rheumatic symptoms** in children. Such are arthritis, fibrous nodules, purpura, erythema, chorea, tonsillitis, endocarditis, and pericarditis. As Cheadle says, "the history of rheumatism may be the history of a whole childhood." The rheumatic child should wear flannel at all seasons. Cold and wet feet should be especially avoided. Exercise and outdoor life should not be too closely restricted; certain days of damp east wind are, however, especially favorable for the

¹ Brit. Med. Jour., Sept. 6, 1902.

² Riforma med., Dec. 20, 1902.

³ Arch. of Ped., Aug., 1902.

development of rheumatism. The diet should be plain, but generous and nourishing. Sugars and starches are probably more harmful than nitrogenous matter. No objection has been made to the use of milk. As a prophylactic, care of the throat and removal of adenoids and enlarged tonsils must be strongly commended. Crandall advises that rheumatic children be given courses of salicylate of soda for 1 or 2 weeks of each month, for months at a time. For the acute symptoms he believes in the use of calomel followed by the salicylates; they should be continued long after the disappearance of symptoms; in this way it seems possible that endocarditis can be prevented. Hyperpyrexia should be controlled with cold baths or packs. Iron, preferably Basham's mixture, should be administered at the earliest possible moment. Beef-juice and cod-liver oil may be given soon after the disappearance of symptoms. Locally, flannel or cotton-wool seems most efficacious. Finally, Crandall believes in the bed treatment of children with any acute or subacute rheumatic manifestation, until every symptom has disappeared.

Hoppe-Seyler¹ encountered a case of **arrested development of the extremities following articular rheumatism**. Joint symptoms began in the seventh year and soon became chronic. The patient died at the age of 23 years. The arms were much shortened and corresponded in length to those of a child 11 years old. The forearms were the length of a child 7 years old. The feet and hands were also shorter than normal, while the thighs and legs were the length of a child 12 to 14 years old. The muscles were the size of those of a child 7 years old. There was no ankylosis, but much fibrous thickening about the joints. The cause of the failure of development must be sought in extension of the inflammation from the joints to the epiphyseal cartilage. The thinness of the diaphyses in this case suggests that they were also affected.

Royal Whitman² reports final results in 2 cases of **polyarthritis in children of the type described by Still**, with remarks on rheumatoid arthritis. In 1 the disease was progressive; every joint except the jaw and the spine was involved and showed smooth fusiform swelling. The lymphatic glands near the affected joints, the liver, and the spleen were enlarged. There was marked secondary anemia. Postmortem examination in the first case showed amyloid changes in the liver, spleen, kidneys, and mesenteric glands. There was no evidence of tuberculosis of the lungs. The second case, showing similar but less marked lesions, recovered. Electric light baths were given for 3 months with apparent benefit. An attack of searlatina completed the cure. In the ordinary form of rheumatoid arthritis the effusion is less marked than in the cases described, and the finger-joints, particularly the first interphalangeal, are normally affected; but in childhood, at all events, the disease may first appear and remain for a time limited to one of the larger joints, the symptoms simulating tuberculous disease so closely that diagnosis is impossible until the extension of the disease to other joints shows its

¹ Deut. Arch. f. klin. Med., Bd. lxxv, 1903.

² Med. Rec., April 18, 1903.

true character. The fingers sometimes are not affected; the spine may also be free from the disease.

A. F. Lemke¹ has observed a case of **arthritis deformans** in a boy of 11 years with "most universal involvement of the joints, including the cervical vertebrae." It was associated with enlarged cervical glands and splenic tumor, but inoculation experiments and pathologic examination failed to reveal any evidence of tuberculosis.

J. Hendrie Lloyd² reports a case of **diabetes mellitus** in a child aged 26 months who, within 10 days of the onset of the disease, had undergone an operation requiring 45 minutes of etherization. The principal symptoms were insistent thirst, polyuria, and rapid emaciation. Death occurred within 3 weeks of the onset of symptoms. The disease seems to be uniformly fatal in young children. It must not be forgotten that temporary glycosuria may occur in infants after the ingestion of sugar or other carbohydrates.

Two other cases of **diabetes mellitus** have been reported: one by M. E. Fisher,³ in a child of 3½ years, ending in coma 1 month after the symptoms were first noted; the other by F. B. Swartzlander,⁴ in a child of 3, who died in coma after an illness of 2 months. The first case had had convulsions 2 years previously, followed by hemiplegia. Partial paralysis of one arm had persisted.

DISEASES OF THE DUCTLESS GLANDS, DEVELOPMENT, AND NUTRITION.

Vargas⁵ has for years been treating cases of **general atrophy** under 2 years of age with injections of a 1 % solution of sodium chlorid or magnesium and sodium sulfate. He cites one example of a child 2 years old, which gained 3 kgm. in weight and 3 cm. in length in 20 days, with morning and evening injections of 100 cc. of his artificial serum.

Combe and Naebel⁶ advise for the treatment of **infantile atrophy** lavage of the intestines with weak solution of tannic acid, frequent disinfection of the bowels with small doses of calomel followed by castor oil or cascara, hypodermoclysis and enteroclysis. The diet should consist of malted foods; one must avoid milk, white of egg, beef-tea, beef and jelly. Occasionally small doses of arsenic are of service. **Phosphorus** is best given in the organic preparation known as lecithin, which is one of the ingredients of yolk of egg, fish, bone-marrow, and cereals. The dose of **lecithin** is 1 cc. given by hypodermatic injection every second day.

From records⁷ kept for the past 25 years at the English schools Rugby and Malborough, the following **comparisons** have been made: At Malborough a boy of 13 in 1903 weighs nearly 6 pounds more and is nearly 2 inches taller than a boy of the same age in 1874. A boy of 18 is 4½ pounds heavier and nearly an inch taller. A Rugby boy of 13 in

¹ Chicago Med. Recorder, Sept., 1902.

² Phila. Med. Jour., March 21, 1903.

³ Amer. Med., Dec. 13, 1902.

⁴ N. Y. Med. Jour., Oct. 18, 1902.

⁵ Revista Med. de Bogota, xxiii, 258.

⁶ Arch. d. Méd. d. Enf., v, 1902.

⁷ Med. News, May 23, 1903.

1902 is more than 6 pounds heavier and $2\frac{1}{2}$ inches taller than 25 years previously; the 17-year-old boy is nearly an inch taller though 1 pound lighter in weight than his predecessor.

Heubner,¹ remarking on the good results of a purely dietetic treatment of **infantile scurvy**, considers this proof that it is a disease of nutrition entirely, but not so deep-seated as rachitis.

Edlefsen² has studied the material in the polyclinic in Kiel and in some Hamburg institutions and compared them with other statistics. The fact that the number of cases of **rickets** reported in the first half of the year increases steadily and nearly always reaches its maximum between the sixth and the ninth months justifies the assumption that the development of the disease is favored by the winter climate. This is in favor of the carbonic acid theory, for which also the strikingly frequent complication of diseases of the respiratory tract speaks. But this explanation does not suffice for all cases—and the infectious theory gains in probability for various reasons. It explains the repeated appearance of cases of rickets in certain dwellings, particularly in those in which other sources of infection, such as polyarthritis, pneumonia, and cerebrospinal meningitis, are found.

Kassowitz³ refutes the infectious theory. **Rickets** does not suddenly flare up, as the infectious diseases so frequently do. Further, the beginning of the disease lies much further back than in the winter months, and must be sought before birth or in the first months of life. Cases in which uncomplicated rickets suddenly appears with febrile disturbance, and which show fever during their course, Kassowitz has not seen. And the enlargement of the spleen is not very frequent and affects especially those children who are at the same time suffering from blood diseases or severe digestive disturbances. Inhaled organic "riechstoffe" ("crowd poisons" and the products of organic decomposition) is the chief causative factor in the development of rickets. This explains the smaller number of cases and their more favorable course in the country and in high climates. The intrauterine infection and the deleterious effect on the bony growth occur only at those times and in those children in which this cause is especially evident. The ammoniacal decomposition of the urea in the urine furnishes such a causative agent, in which atmosphere children always acquire rickets in a specially severe form.

Epstein⁴ describes a rocking chair adapted to the treatment of **infantile rickets**. It allows free play for the muscles, and helps to overcome the spinal curvature. The child sits facing the back of the chair with its legs hanging over the rockers.

Mendel⁵ believes that disturbances of nutrition lead to rickets by their deleterious action on the **secretion of the thymus gland**. He gives the rachitic infant as many grams of fresh calves' thymus as the child is months old. The treatment must be pursued for several months to be of

¹ Berl. klin. Woch., March 30, 1903.

² Deut. Aerzte-Zeitung, 1901, Nos. 22-24; 1902, Nos. 8 and 9.

³ Deut. Aerzte-Zeitung, 1902, No. 3. ⁴ Arch. f. Kinderheilk., Bd. lvi.

⁵ Centralbl. innere Med., Sept. 6, 1902.

service. It is not efficacious in specific diseases of the thymus such as syphilis and tuberculosis.

Escher,¹ from the observation of 105 newly born infants and from sections of 25 cadavers, found not a single instance in which the clinical or microscopic findings justified the diagnosis of **congenital rickets**. If every distinct enlargement of the costoepiphyseal junction is to be considered a sign of rickets, as well as every yielding of the edges of the cranial bones, the total number of cases of rickets would reach 85 %, which corresponds to the figures given by Kassowitz, Schwarz, and others.

Isaac A. Abt² refers to the oft-repeated observation that **Italian and colored children show the most striking examples of rickets**, and thinks that the decided change in environment which these people have undergone in leaving a semitropic for a north temperate climate probably plays a part in this. Since the changed conditions bring much less fresh air and sunshine than they had been accustomed to, and conversely much more crowding in ill-ventilated rooms, this explanation may be the correct one. Abt considers cod-liver oil the sheet anchor in medicinal treatment, simply because it is a readily assimilable fat. The food should be digestible, without giving rise to fermentation; it should be fresh, and it should contain as much fat as the child can digest; fruit juices and animal broths are of undoubted value. Arsenic and iron are indicated for anemia; salt baths for cases which perspire freely; and fresh air and sunshine in all cases. [We have never felt convinced that the value of cod-liver oil depended solely on the fat contained in it.]

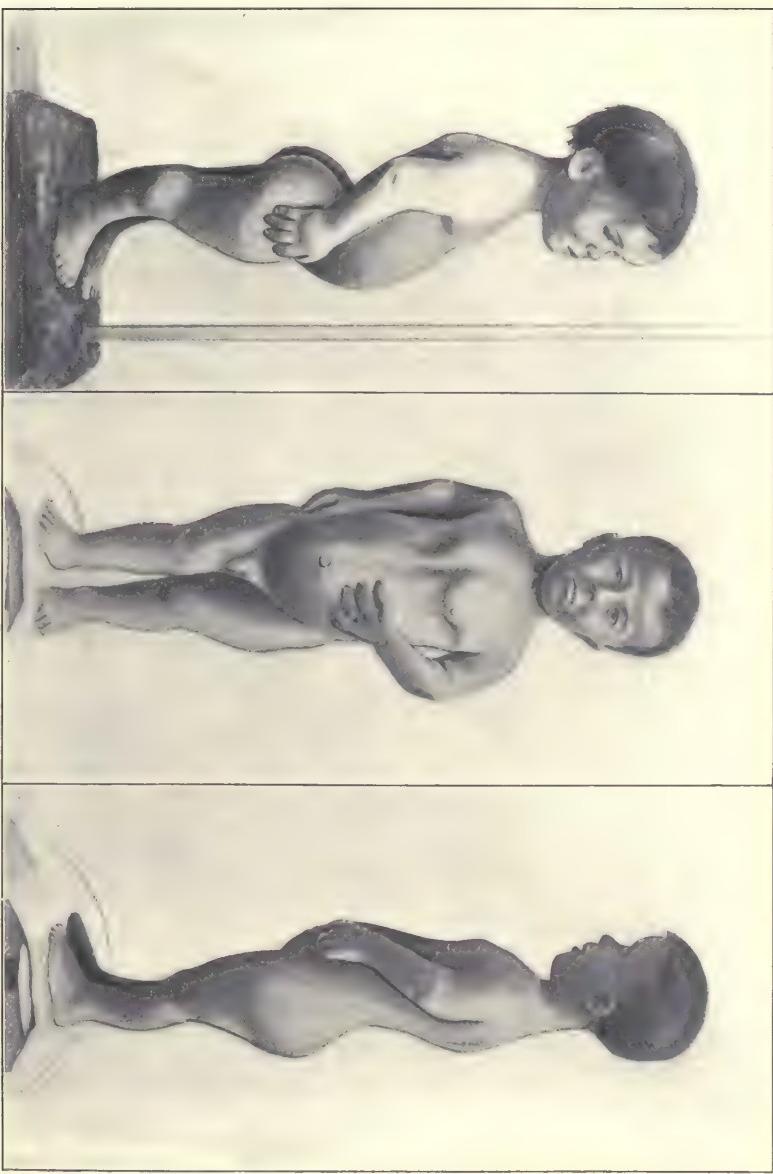
Three cases of **achondroplasia**, with photographs and skiagrams, are reported by A. Jefferys Wood and Herbert M. Hewlett.³ (Plates, 1, 2 and 3.) In Germany Kaufmann places these cases under the heading **chondrodystrophia foetalis**. Cases of achondroplasia were first described as cases of fetal rickets until Depaul pointed out that the bony changes were essentially different from those found in rickets. Virchow then described these cases under the heading of fetal cretinism, but the thyroid gland was found to be unaffected. In these dwarfs the arms and legs are shorter than normal, and the tissues seem redundant, often lying in folds over the shortened bones. The trunk is of normal length, but seems to be narrow, whilst the head is larger than normal, being prominent in front and at the sides. There is a sulcus at the root of the short thick nose, and the prominent forehead tends to intensify this depression. The hands exhibit a curious anomaly, to which John Thomson, of Edinburgh, first drew attention. The fingers do not lie parallel as in a normal hand, but show a curious divergence, 2 fingers sloping to the ulnar side and 2 to the radial side of the mid-line of the hand. The fingers, moreover, are stunted and conical. The skin, hair, and nails are normal in development. The gait is usually of a waddling nature. These children are very bright. A large number of cases of achondroplasia die at or shortly after birth, but a number of cases that survive birth develop well, excepting with regard to their height. Adult cases rarely exceed 4 feet in height. In searching

¹ Arch. f. Kinderheilk., Bd. lvi.

² Clin. Rev., March, 1903.

³ Internat. Med. Jour., Aug. 20, 1902.

PLATE 1.



Wood and Hewlett's cases of achondroplasia (Intercoll. Med. Jour., August 20, 1902).

PLATE 2.

Wood and Hewlett's cases of achondroplasia (Intercol. Med. Jour., August 20, 1902).

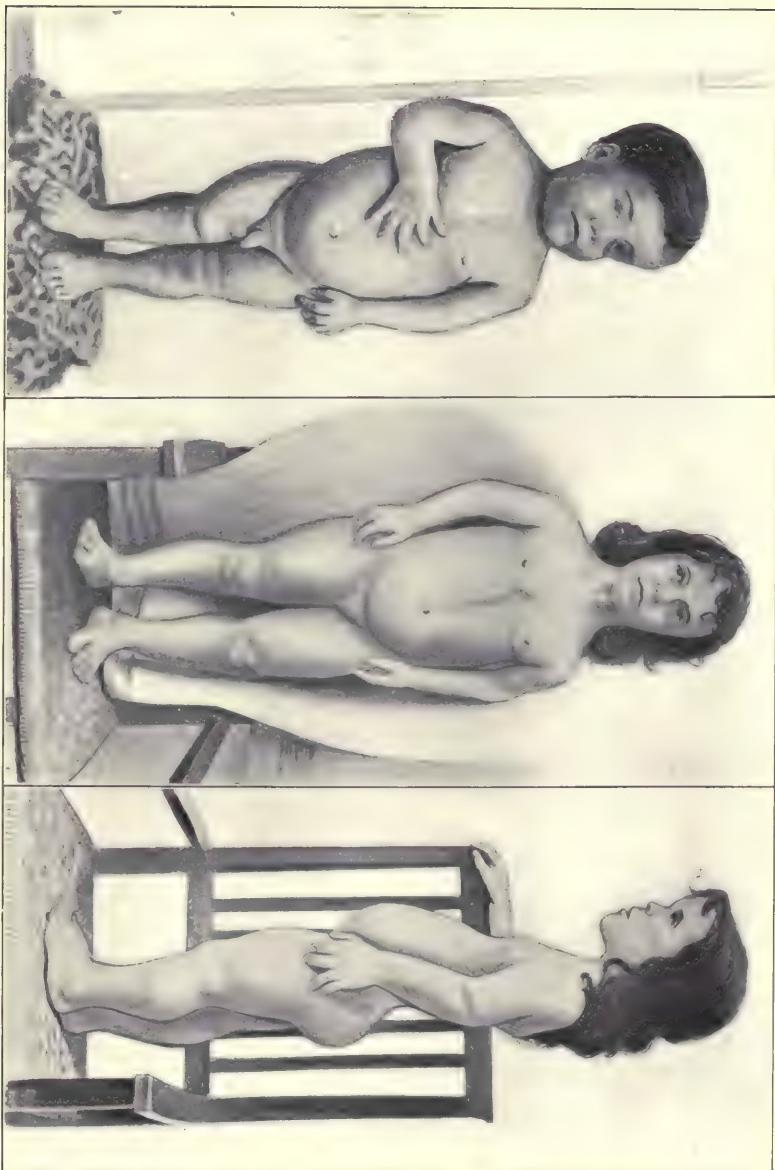


PLATE 3.

Wood and Hewlett's cases of achondroplasia. 1, Achondroplastic hand; 2, skiagram of achondroplastic elbow; 3, skiagram of achondroplastic hand (Intercat. Med. Jour., August 20, 1902).

1.

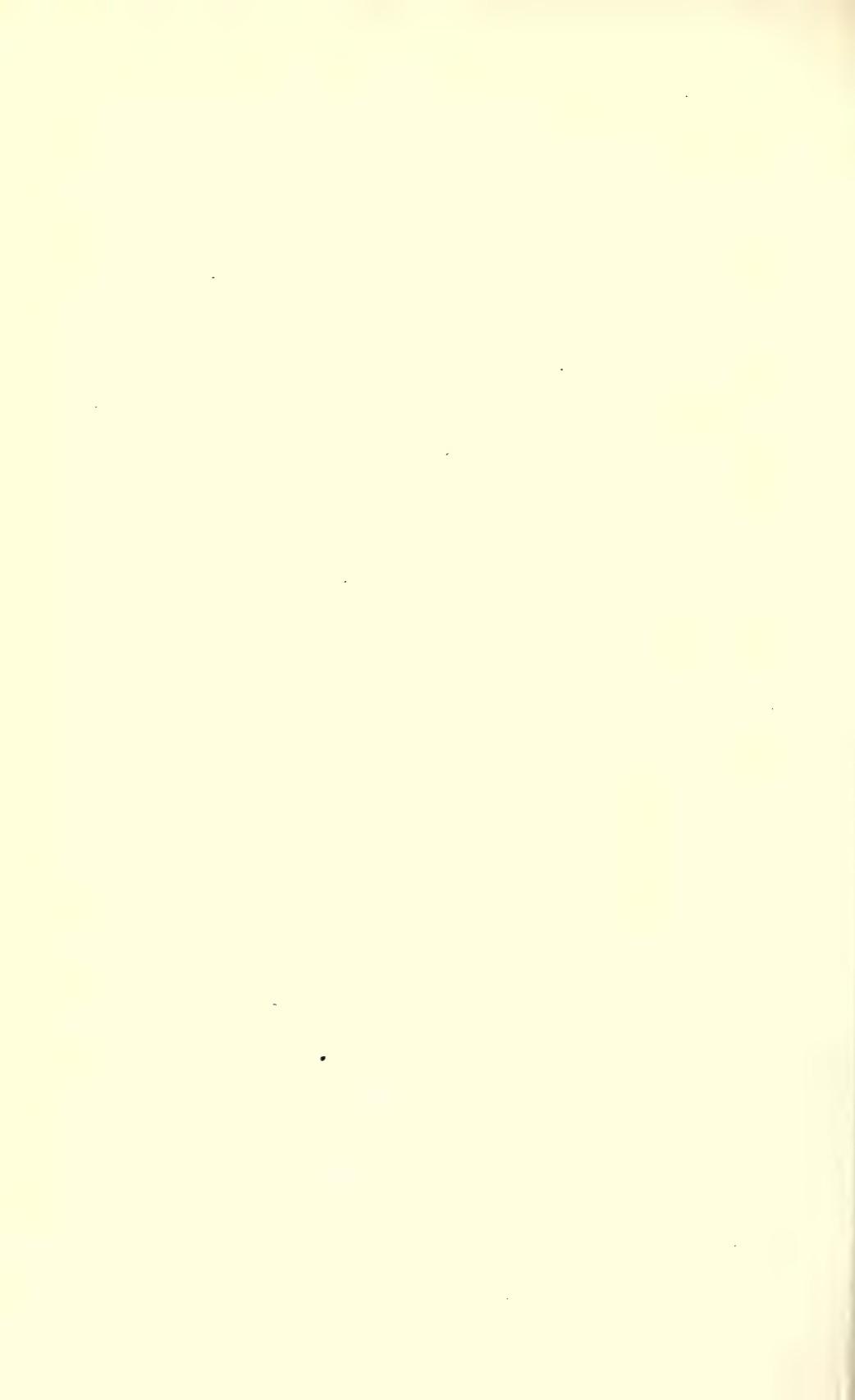


2.



3.





through a volume of old engravings at the Melbourne Public Library, the authors found a picture of the Dutch dwarf, Wybrand Lolkes, who was exhibited by Philip Asley in London during A. D. 1790. His height was only 27 inches at the age of 60 years, and anything more characteristic of achondroplasia than his head and hand could not be wanted. He was very muscular and agile, and was the father of 3 healthy, well-developed children. An achondroplastic dwarf, well known in Auburn 40 years ago, is still well and working on a farm near Preston. In female achondroplasies the narrowness of the pelvis is a serious affection during confinement, requiring Cesarean section. Bœckh reports the family history of an achondroplastic woman, whose father and great-grandfather were both similarly affected, so that this affection can clearly be transmitted from parent to offspring. The chief pathologic features of achondroplasia lie in that part of the skeleton developed in cartilage from the third to the sixth month of fetal life. Thus we have the long bones of the arms and legs, including the metacarpals, metatarsals, and phalanges, as well as the ribs, and the bones of the pelvis. The base of the skull also, developed in cartilage to a large extent, is arrested in growth at an early period. Those bones that remain cartilaginous until after the sixth month of fetal life, and ossify later, show no abnormalities; these are the sternum, patella, costal cartilages, tarsal and carpal bones. The bones that are formed in membrane show no abnormalities, so that the membrane-formed part of the occiput, the bones of the vault of the skull and the clavicles are well formed. Barlow, Shattock, Sutton, and Bowlby, in their various post-mortem examinations on cases they designated fetal rickets and fetal cretinism, all drew attention to the fact that the epiphyses of the long bones were cut off from the diaphyses by an ingrowth of connective tissue from the periosteum. If the epiphyseal or conjugual cartilage is thus cut off from the diaphysis early in fetal life, the arrest of further growth of the diaphysis is explained, and the further growth of the bone must then depend entirely on the periosteum, which leads to great thickening of the shaft and a moderate cupping of the extremities of the diaphysis round the epiphysis. In skiagrams this overgrowth from the end of the diaphysis can be seen at the anterior ends of the ribs, where the costal cartilages are surrounded by a bony ring. This cupping of the end of the rib round the costal cartilage causes a beading of the ribs in front, very similar to the beading of the ribs in rickets, but it does not disappear early in life like the cartilaginous bead of rickets. The periosteal growth of bone is also well seen round the lower epiphysis of the humerus, leading to a distinct limitation in the range of extension of the elbow-joint. From the microscopic appearances of the bones, at the junction of the small wedge of endochondral bone and the terminal cartilage no normal ossification can be found; there are no parallel rows of cells; no progressive formation of medullary spaces; there is an absence of vessels at the ossifying junction, and the typical organ-pipe arrangement of structures is either not recognizable at all or only here and there, and that faintly. The large cartilaginous epiphyses of the long bones at birth consist en-

tirely of hyaline cartilage, and the short diaphyses are made up almost exclusively of periosteal bone, in which a medullary canal is absent, or represented only by some intertrabecular spaces, slightly larger than usual. The growth of medullary vessels toward the conjugal cartilage is therefore prevented. The epiphyses increase in size by growth from the perichondrium, and this is irregular, and apparently excessive in parts, giving rise to deformity in the neighborhood of the joints. The movements of some of the joints are in excess of the normal range, as is well seen in the wrists and fingers of the author's cases. One marked feature of all the cases in this report is the limitation of extension at the elbow-joints to an angle of 135°. Lordosis is another characteristic feature and apparently becomes more marked with age. It seems to be due to an abnormal anterior bowing of the lumbar spine, as it cannot be obliterated by making the patients lie on their backs and fully flexing their hip-joints. In the authors' cases skiagrams of the hip-joints show no abnormality of the neck of the femur. Skiagrams of the hand show the phalanges much shorter and broader than in the normal hand; the epiphyses are normally ossified, and are unattached to the diaphyses. The long bones appear to be shortened and thickened; there is very little sign of bowing of any of the long bones. The epiphyses all appear normal. The absence of pseudolipomas in the neck, the presence of a thyroid gland, and the general brightness of the children should exclude the diagnosis of cretinism. Unfortunately, there is nothing to add in the way of treatment; the chance of ever being able to make these dwarfs grow seems *nil*. Thyroid gland has been administered, but without any good result.

John Lovett Morse¹ records a case of **chondrodystrophia foetalis** in a child of Italian parents, with typical bony deformities, of apparently normal intelligence, and without apparent lesion of the thyroid. He died 2 months later of some enteric disease and autopsy could not be obtained. Morse is unable from this case to add to our knowledge of the etiology of the disease.

Comby² reports a typical case of **achondroplasia** in a boy 5½ years old, of normal intelligence, with no signs of rickets or of myxedema. The typical features of these cases are the large globular head, the shortness of the extremities, especially of the arms and thighs, with a normal trunk. The lumbar curve is much accentuated, and in women there is narrowing of the pelvis. Obesity is rather frequent. The hand is short and square, the fingers short and of almost equal length—separating like a trident. The legs are often bowed; muscles usually well developed. Achondroplasia is to be differentiated from rickets by the time of its occurrence in intrauterine life. It does not cause deformities of the sternum, the ribs [?], and the clavicle, which are common in rickets. It does not cause marked curvature of the diaphyses, etc. The fluoroscope shows the large flattened epiphyses and the hyperplasia of the cartilaginous junction.

¹ Arch. of Ped., 1902.

² Arch. de Méd. d. Enf., v.

Pineles¹ regards **congenital myxedema**, **infantile myxedema**, and **endemic cretinism** as three distinct diseases. The first displays symptoms during the second half of the first year or after; the second becomes manifest after the sixth year and cretinism is evident in earliest childhood. The first is usually severe, the second mild, and the third may be either. In the first the thyroid gland is defectively developed: in the second there is atrophy, and in cretinism there is strumous degeneration and occasionally atrophy. The so-called sporadic cretinism belongs in the group of congenital myxedema. [This is a refinement of classification with which we are not in accord.]

Meigs² reviews the subject of **infantilism**, characterizing it as an abnormality of development with persistence of morphologic characteristics pertaining to infancy in a subject who has reached or passed the age of puberty. Physical is usually associated with psychic retardation. He divides infantilism into two types—the **myxedematous** and **Lorain's type**. In the first the face is chubby, the lips prominent, the nose small, and the hair fine; the abdomen is usually prominent, the genital organs are rudimentary, and there is absence of axillary and pubic hair. The voice is high pitched and the thyroid gland is generally small. The mental state is infantile. Second dentition is often retarded or absent, and there is failure of the epiphyses to unite. Lorain's type is represented by an individual small in stature but of the adult type—a man in miniature. The pubic and axillary hair is wanting and the intelligence generally is fair. The first is due to thyroid insufficiency; the second is part of a general process of defective nutrition which may be associated with hereditary syphilis, tuberculosis, alcoholism, and various forms of poisoning.

Rosa Engelmann³ gives the following differential characteristics of **sporadic cretinism** in children: (1) Absence of, atrophy, or disease of the thyroid gland. (2) Mental torpidity and physical backwardness. (3) Weak musculature. (4) Paleness, puffiness, and dryness of the skin; later, a thickening and inelasticity of the underlying tissue. (5) Abdominal distention. (6) Umbilical hernia. (7) Constipation. (8) Rudimentary dentition. (9) Brachycephalic skull and a general skeletal arrest, more marked in the long bones. The process is a slow, lineal, symmetric delay of ossification. (10 and 11) Radiographic verification of the fact showing also absence of partial or backward evolution of the small bones of the hands. (12) Presence of Koplik's stigma of degeneration: viz., excessive prominence of and over the os pisiformis, separating the wrist-crease from the antithenar eminence. (13) Progressive anemia. (14) Small heart, slow, almost impalpable pulse, cold mottled surface, subnormal temperature. (15) Suprascapular, supraclavicular, and other connective-tissue or colloid pads. (16) Hoarse, low-pitched cry and voice. (17) Standing on a broadened base; Romberg's sign; sluggish gait. The disease in children should be called "sporadic, infantile, congenital or acquired athyreia or myxedema." "Sporadic cretinism" or

¹ Wien. klin. Woch., Bd. xv, No. 43.

² Gaz. des Hôpitaux, Feb., 1902.

³ Jour. Am. Med. Assoc., Feb. 14, 1903.

"myxedematous idiocy" should be used to designate untreated or adult cases.

Kassowitz¹ reports 22 cases of **myxedema**, 75 cases of **mongolism**, and 7 cases of **micromelia** in children. In all his cases the deformity was congenital. He discusses the symptomatology and pathology of these three types and the result of thyroid treatment.

J. P. Crozer Griffith² reviews the causes of **sudden** and **unexpected death** in early life and details illustrative cases. The low resisting power of infants and the great excitability of the nervous system are the chief reasons for these occurrences. Affections of the respiratory apparatus seem to come first as etiologic factors. Death may rarely occur from aspiration or swallowing of the tongue, in coryza or pertussis. Asphyxia from overlying is probably infrequent. Weakly, and especially premature, infants born with asphyxia are exceedingly prone to suffer a relapse. Spasm of the glottis is an undoubted cause of sudden death; it depends on great irritability of the nervous system, oftenest seen in debilitated and rachitic children, but, at times, independently. Oftener, however, such deaths in reality depend upon syncope. Paltauf's theory of the "status lymphaticus" as a cause of sudden death is still *subjudice*. It seems certain that a much enlarged thymus may compress the trachea, the heart, large vessels, or recurrent laryngeal nerves, and produce death, but such cases are rare. Pressure on the trachea alone should cause a slow death, and the theory that sudden swelling of the thymus occurs seems to have been disproved by Friedleben's experiments. Sudden death can occur without enlargement of the thymus, and in many cases with the latter condition death is due to other causes. One fact is clear: that there is a certain constitutional anomaly seen in some children and even in adults, which predisposes to sudden death from trivial causes. It would seem probable that the status lymphaticus is often, but not always, seen in such cases. This constitutional anomaly depends on a state of faulty nutrition. Metabolism is in some way at fault. It is attended by pathologic disturbance of the nervous centers with extreme nervous irritability. Many of these cases are subject to repeated attacks of true laryngospasm. Sudden death in these attacks is probably due, however, to a sudden cardiac paralysis, as pointed out by Escherich and others. Other causes for cardiac paralysis have been reported, such as the giving of a hypodermic injection, or the puncture test for pleural effusion. The final symptoms, well described in detail by Pott, are quoted by the author. They are those of sudden convulsive apnea, the heart's action having ceased at the beginning of the attack. Among other causes of sudden death should be mentioned a rapid-developing bronchopneumonia, most common in the newborn; pertussis with spasm of the larynx; expiratory apnea (Kassowitz); heart-failure, as in diphtheria, or in pleural effusion, or in any debilitated condition. More rarely than in adults, sudden death may occur in organic heart-disease; other common causes are the conditions leading to convulsions. Hyperpyrexia, sudden chilling, congenital syphilis, aspiration of food and a variety of

¹ Jahrb. f. Kinderheilk., Bd. Ivi.

² Amer. Med., June 20, 1903.

pathologic processes, such as rupture of a retropharyngeal abscess or hemorrhage, may be exciting causes. What is probably a central involvement of respiration may occur and end fatally. These cases sometimes suggest intestinal toxemia as the exciting factor.

Ganghofner and Richter¹ conclude that in a majority of cases of **sudden death** we must seek for some other cause besides the **status lymphaticus** and **enlargement of the thymus gland**. The status lymphaticus is often associated with disturbances of nutrition and the absorption of toxins. Capillary bronchitis and degeneration of the heart-muscle are frequent causes of sudden death.

Krautwig² exhaustively reviews the causes of **sudden death** in childhood. The author considers that it is most unusual for the **thymus** to cause death by pressure, although this gland is commonly found enlarged in childhood as well as in adults.

Augustus Caillé³ reports a case of **sudden death** in an infant 6 months old in which the lower pole of an enlarged thymus gland compressed the large vessels in such a way as to cut off the circulation.

Stokes, Ruhrah, and Rohrer,⁴ from 18 autopsies in cases of infantile atrophy and 3 on secondary atrophy of tuberculosis, conclude that the condition of the **thymus gland** is an index of the general nutrition in infants, and that the state of nutrition may be estimated by a microscopic examination of the thymus.

Richon⁵ reports a typical case of **Addison's disease** without lesion of the suprarenal capsule, or of the semilunar ganglia, or ganglia of the solar plexus.

H. D. Bolleston⁶ reports 2 cases of **hereditary edema** of the lower limbs in a boy and a girl coming on at the age of 10 and 13 years. It lacked the sudden disappearing and returning of angioneurotic edema, and the pain of erythromelalgia, although resembling in some respects both this and Raynaud's disease. It disappeared after prolonged rest in bed. In earlier childhood the patients had been subject to chilblains and cold extremities. The mother had suffered from a similar edema for 35 years. The family history was otherwise entirely negative, and no pathologic cause could be found which would account for such a condition.

DISEASES OF THE KIDNEYS AND GENITOURINARY TRACT.

Hohlfeld⁷ studied the **urine** in 5 cases of chronic **gastrointestinal catarrh**, 16 cases of chronic catarrh of the large intestine, 16 cases of acute colitis, and 3 cases of cholera infantum, all infants varying in age from a few days to 10 months. In the first 5 cases he found slight traces of albumin; hyaline, granular, and epithelial casts, red and white blood-corpuscles were occasionally present in the terminal stages (atrophy)

¹ Jahrb. f. Kinderheilk., Bd. lvi.

² Arch. f. Kinderheilk., Bd. xxxv.

³ Arch. of Ped., March, 1903.

⁴ Am. Jour. Med. Sci., lxxiv, No 5.

⁵ Arch. d. Méd. d. Enf., vi, 1903.

⁶ Lancet, Sept. 20, 1902.

⁷ Deut. Arch. f. klin. Med., Bd. lxxiv.

of the disease. Albumin and casts were found in nearly all of the next group of cases; often the casts were very plentiful. The sediment often contained urates. In acute colitis albumin was uniformly present, hyaline casts were very plentiful, epithelial casts less frequent; urates often formed a dense precipitate. Renal epithelium, leukocytes, and free fat-globules were found. The secretion of urine in cholera infantum was very slight. In all cases the specific gravity was high, the reaction for albumin marked; granular, fatty, and epithelial casts were plentiful. In 4 cases of the series edema was present. It is hard to decide whether the symptoms of intoxication are due to uremia or to intestinal infection; but in 2 cases at least the diagnosis of uremia seemed justifiable.

In an article on **cyclic albuminuria** Leo Schaps¹ states that the majority of cases occur between the fifth and fifteenth year. It is much more common in the female sex, the proportion being 4 to 1. The cases observed were nearly all in pallid, poorly developed and slender children. Most of them suffered from constipation and were subject to affections of the throat. The cases showed diminished capacity for work and power of resistance. Out of 35 cases, 20 showed symptoms of heart disease, such as palpitation, rapid pulse, arrhythmia, murmurs, and alterations in size of the heart. These signs and symptoms changed rapidly in intensity and often in quality. Organic heart-disease was not present, but 1 case showed the disturbances characteristic of Germain Sée's **hypertrophie et dilatation de la croissance** (hypertrophy and dilation of growth). Contrary to the usual statements, most of the cases observed for a period of several years showed marked symptoms, such as headache, loss of appetite, and fatigue, and continued pale and thin. The frequent occurrence of cyclic albuminuria in several members of a family shows the marked individual predisposition either of the kidneys or of the circulatory system to this disease. It seems most likely that the primary disturbance is in the heart.

J. Dupoux² regards **motility of the kidney** in children as a stigma of degeneration. It may be congenital, dependent upon feebleness and relaxation of the ligaments. It usually escapes observation for want of systematic search. The application of a bandage usually suffices to retain the kidney in its place.

K. Walko³ has treated **enuresis** in children with rectal massage of the neck of the bladder or vibratory massage in the region of the bladder. It is not easy to determine whether the effects of massage depend on suggestive action or on the actual local effect. It is capable of completely and permanently curing the complaint, which is, therefore, not due to faulty muscular development. It is probably either a local or part of a general neurosis.

Frank T. Hopkins⁴ has used tincture of lycopodium in doses of 15 to 30 minims 4 times a day, in cases of **nocturnal enuresis**. This may be combined with belladonna or bromid.

¹ Arch. f. Kinderheilk., Bd. xxxv.

² Thèse de Paris, 1902.

³ Zeit. f. diätet. physik. Therap., Bd. vi, No. 6.

⁴ N. Y. Med. Jour., Nov. 1, 1902.

Gershel¹ reports **subcutaneous abscesses** due to the **gonococcus** in a child 2 years old admitted to the hospital with typhoid fever. Two days later acute anterior urethritis developed. The abscesses were on either side of the anus and not connected with the deeper structures; they healed very slowly. There were no complications. Eleven similar cases have been reported.

Neter² concludes that: (I) **Genital tuberculosis** can occur as a primary affection, usually in the form of tuberculosis of the fallopian tubes. (II) It can be the starting-point of tuberculous peritonitis. (III) This etiologic factor must be considered in the diagnosis of tuberculosis of the peritoneum. (IV) In cases of that disease coming to operation the adnexa should be examined. (V) The vaginal discharge must be examined for tubercle bacilli if we suspect tuberculous peritonitis, more especially in the case of anemic and scrofulous children. A negative result does not exclude tuberculosis.

DISEASES OF THE NERVOUS SYSTEM.

G. M. Hammond³ defines **neurotic children** as those whose nervous force is below a normal standard. He believes this handicap can be overcome by proper training, begun early; namely, mainly nitrogenous diet, plenty of sleep and fresh air, systematic physical culture, strict obedience, and self-restraint to control emotions. Education should be cautiously advanced.

Next to the omnipresent, inevitable laws of inheritance comes the never-ceasing formative power of environment. The law of birth determines the potentiality of the nervous system. The impress of extraneous influences guards or mars its early growth. Unfortunately, the same parents who gave the child its poor nervous apparatus are the ones who misguide its early steps. For preventing **nervousness in such children**, Hugh T. Patrick⁴ considers that nothing is so effective as toughening of the body and mind. A child who is made to have hard muscles, strong lungs, and a vigorous digestion; who can bear changes of temperature and endure pain, is already a long way from nervousness. More important still is toughness of psychic fiber. The child who can support disappointment, who can be "crossed" without a tantrum, and who habitually obeys, is building a bulwark against nerves. One who is not easily frightened, has self-control and a budding courage, is not likely to become the subject of neuroses. To procure this toughness a certain exposure to bodily discomfort and mental hardship is necessary. There are two capital errors frequently made in training children: First, leading the child into pleasures and duties beyond his years; second, magnifying his importance in the family and society. As an instance of the first error may be mentioned the casualties following graduation from hot-house schools and colleges. The second error leads to centripetal development—development centering in

¹ Med. Rec., Feb. 7, 1903.

² N. Y. Med. Jour., Aug. 30, 1902.

³ Arch. f. Kinderheilk., Bd. xxxvi.

⁴ Jour. Am. Med. Assoc., Feb. 7, 1903.

self. Childhood should be absolutely fearless—since fear in one form or another enters into the make-up of nearly every sort of nervousness

Luigi Capellati¹ emphasizes the following symptoms in **neurasthenia in childhood**: (1) Loss of attention, causing backwardness at school; (2) irritability and restlessness; taciturn and melancholy moods; (3) exaggerated or deficient memory; (4) loss of will-power; (5) unreasonable fear of school. Besides these, various physical symptoms may be present, such as headache, insomnia, muscular debility, anorexia, irritable heart, various vasomotor phenomena, etc. One psychic symptom he regards as characteristic—namely, the tendency to constant doubt in the mental operations of these children. This is more easily noticed in children, as they are naturally more impulsive than adults.

G. A. Sutherland² cites cases of functional tremors of the arm, spastic contraction of the leg, functional aphonia and eructation, functional paraplegia and functional dysphagia dependent on **neuroses** in children. These are most frequent between the ages of 9 and 14, and are undoubtedly to be associated with developmental changes preceding puberty. Treatment includes isolation of the patient from home influences, or under the charge of a trained nurse, the teaching of self-control, open-air life, cool baths, massage, etc.

Heineman³ reports **disturbances of speech** (bradyphasia, aphasia) and **psychoses** following infectious diseases. He considers the former of functional origin. The more severe psychic disturbances are probably due to the presence of toxins circulating in the blood. The prognosis is good.

T. D. Crothers⁴ finds certain predispositions in children with **alcoholic ancestors**: A tendency to exhaustion from feeble vitality, and a low power of restoration; an instability of cell and nerve function, with strong predisposition to develop into some particular form of degeneration. There is a special affinity for all nerve stimulants and narcotics by the higher nerve-centers; thus alcohol, tea, coffee, etc., have a peculiarly delusive action. In treatment, these, as well as narcotics, should be used with great care. Meats should be excluded from the diet because they act as stimulants to a brain already unstable and exhausted. Hygienic treatment is of the greatest importance, and moderation in the expenditure of energy and nerve force is to be obtained. Crothers believes that the treatment of inebriety, will in the future begin in infancy.

J. S. Lankford⁵ discovers a potent **cause for increasing insanity** in the excessive amount of mental work which is imposed on school-children. The most ambitious are the ones to suffer most. Reduction in the course of study, culture of the body co-equally with the mind, better classification of pupils, and the introduction of manual training suggest themselves as prophylactic measures.

Hamill⁶ reports a case of **sinus thrombosis** resulting in extensive cerebral hemorrhage in an infant 15 days old. Fever was persistently

¹ Riforma med., April 9, 1903.

² Edinb. Med. Jour., xii, No. 3.

³ Arch. f. Kinderheilk., Bd. xxxvi.

⁴ Med. News, Nov. 29, 1902.

⁵ Med. News, 1902, p. 81, No. 2.

⁶ Arch. of Ped., April, 1903.

high, and there was an extensive papular eruption on the face, neck, and arms. The child died on the sixteenth day, after a copious intestinal hemorrhage. The autopsy showed thrombosis of the superior longitudinal, left lateral and the straight sinus, and the veins of Galen. Clotted blood was found overlying both hemispheres, and in the lateral ventricles. The history of the case, the temperature record, the result of the bacteriologic study, demonstrating a short, rather thick bacillus, closely simulating the colon bacillus, and the unhealthy appearance of the umbilical stump, mark this as one of those not uncommon cases of infection of the newborn.

Von Bokay¹ has obtained favorable results from systematic lumbar puncture in **chronic internal hydrocephalus**, small amounts (50 to 60 cc.) of cerebrospinal fluid being withdrawn at intervals of about 4 weeks. In his experience communication between the lateral ventricles and the subdural space exists as a rule in both acute and chronic, congenital and acquired hydrocephalus.

Bela Schick² describes the clinical course of 2 cases of **hypertrophy of the brain** with the postmortem findings. This study teaches that when we meet with diffuse clonic convulsions beginning soon after birth, and becoming more and more frequent, without definite localization, with loss of consciousness and with diminution of the cerebrospinal pressure, especially when lumbar puncture shows absence of fluid in the cord—we must consider such a symptom-complex as a manifestation of hypertrophy of the cerebrum.

J. A. Coutts³ reports a case of **acute ependymitis** in an infant, with vomiting, convulsive attacks, increased reflexes, retraction of the head, and fever. The diagnosis between this and meningitis is practically impossible.

Goldreich⁴ reports a case of **suppurative meningitis** in a newborn infant, due to infection during parturition.

In 5 cases of **tuberculous meningitis** confirmed by autopsy Léri⁵ could find no sign of increased permeability of the meninges. The author considers that persistent impermeability of the meninges has neither positive nor negative value in diagnosing tuberculous meningitis.

Eugen Schlesinger⁶ observed a case of **tuberculous meningitis**, beginning suddenly with unilateral convulsions which were followed by complete right-sided paralysis and aphasia. Within 36 hours the paralytic phenomena disappeared, whereupon the typical prodromal stage of tuberculous meningitis began and ran its usual course, ending fatally on the fifteenth day. In a tuberculous child the occurrence of severe convulsions and paralysis should make us suspect tuberculous meningitis, even when the classical features of this disease are not present.

K. Barth⁷ adds another case to the few recorded instances of cure of proved **tuberculous meningitis**. The patient was 33 months old.

¹ Jahrb. f. Kinderheilk., Bd. lvii, 1903.

³ Lancet, April 25, 1903.

⁵ Arch. de Méd. d. Enf., vol. v.

⁷ Münch. med. Woch., 1902, No. 21, p. 877.

² Jahrb. f. Kinderheilk., Bd. lvii, 1903.

⁴ Jahrb. f. Kinderheilk., Bd. lvi.

⁶ Arch. f. Kinderheilk., Bd. xxxiv, 1902.

The illness lasted about 6 months: The symptoms included intense headache, slow pulse, Cheyne-Stokes type of breathing, and convulsions. The cerebrospinal fluid contained tubercle bacilli. Wet cups over the mastoid regions relieved the headache and caused a rapid fall of temperature. All symptoms finally yielded to appropriate treatment.

Alfred Hand, Jr.¹ insists on the value of lumbar puncture in the diagnosis of **meningitis**, especially of tuberculous origin. Its value may be positive or negative. The presence of sugar in the cerebrospinal fluid, when other signs indicate meningitis, is suggestive of tuberculous disease. Its absence does not exclude tuberculosis, and is said to be the rule in other forms except the **serous**, in which it is much diminished. Albulmin is usually reduced in meningitis—to a less extent in the tuberculous form. It may also be reduced in normal cases. The maximum normal unit is said to be 0.25 part per 1000. Hand has found polymorphonuclear leukocytes in excess of other forms wherever tubercle bacilli were not found. For determining the presence of bacteria he examines the film of fibrin which forms in the undisturbed fluid after 1 to 6 hours. This is removed by touching the edge with a straight platinum needle and transferring the film to a slide. The greatest care must be exercised to keep the film constantly floating in fluid, part of this being poured onto the slide. When safely on the slide it is detached from the needle by another needle or pin, the excess of fluid is drained off, and the remainder evaporated. The film should not be pressed out by another slide, but should have been removed in such a way as to lie flat. Those germs which float free in the fluid may be seen in other portions of the slide if a sufficiently large amount has been evaporated. The slide is fixed by heat and stained in the usual way. The fields should be carefully gone over on the mechanical stage. From the remainder of the fluid cultures should be made, then the chemic examination, and finally inoculation into guineapigs, if this is deemed advisable.

Acute poliomyelitis and encephalitis are often associated, says Batten.² He suggests as a classification: (1) Acute polioencephalitis superior, including those cases of paralysis in which the frontal, motor, and occipital regions of the cortex and the cerebellum are affected; (2) acute polioencephalitis inferior, where the nuclei of the cranial nerves are affected; (3) acute poliomyelitis anterior, where the gray matter of the anterior cornua below the medulla are affected. Pathologically the disease is characterized by thrombosis of small vessels in the brain and cord with exudation, round-cell infiltration, and necrosis in the surrounding areas. Illustrative cases are cited.

An **epidemic of some 30 cases of acute nervous disease** occurred in Dutchess County, N. Y., during 1899. Of 17 cases recorded by D. H. Mackensie,³ 41 % proved fatal. Two of the cases presented classical symptoms of poliomyelitis, and 1 of cerebrospinal meningitis. The remaining cases were probably examples of multiple neuritis. The diagnosis of Landry's paralysis was made in 2 of them. All of the cases

¹ Phila. Med. Jour., Aug. 30, 1902.

² Lancet, Dec. 20, 1902.

³ Med. Rec., Oct. 4, 1902.

occurred within an area of country 10 miles in diameter, and seem to have been of undoubtedly infectious origin.

Charles F. Painter¹ reports an epidemic of **infantile paralysis** occurring at Gloucester, Mass., in the summer of 1900, when the weather was marked by unusual fluctuations in temperature. No other disease was epidemic at that time. Accurate data were obtained in 32 cases, but many others occurred which could not be verified. Of the 32 cases, only 1 was fatal, but the paralyses were permanent in all of the remainder. Although it was impossible to determine the nature of the infection, Painter believes that the epidemic affords evidence of the infectiousness of anterior poliomyelitis.

Abraham Jacobi,² in an exhaustive article on the **causes of epilepsy** in the young, states that this disease appears to be more directly inherited than any other cerebral disorder. He does not admit that two healthy persons, be they never so closely related, must for the reason of consanguinity have a diseased child. He enumerates the many and varied causes which have been operative in the production of epileptic attacks. It is only by the most thorough and painstaking examination of all the organs and the whole surface of the body that the true cause of the disease in any given case can be detected. When children of 5 or 7 years, generally undersized and puny, such as Fournier has pictured as parasyphilitic, are suddenly attacked with epilepsy, syphilis should be suspected. Suspicious symptoms are early imbecility or idioey, glandular swellings, chronic periostitis, and anomalous teeth. Genuine hypertrophy of the brain is not frequent, but Jacobi has seen it once with epilepsy that began when the child was a year old, and persisted until the autopsy was made 3 years later.

Genuine hypertrophy must be distinguished from **premature ossification** of the fontanels and sutures. When synostosis is uniform, the shape of the head is nearly spheric; when it is local, the corresponding part of the skull and brain is rather flattened, while the opposite is bulging. In this way the asymmetry of the skulls of many epileptics is easily explained. In these cases the fontanel may close at the third, sixth, or tenth month. The first teeth to appear are not, as in the healthy, the lower incisors, but the upper. These symptoms, together with the shape of the head as described above, justify the diagnosis of premature ossification. A frequent cause of epilepsy is asphyxia of the newly born. Intracranial hemorrhages and convulsions from whatever cause are also sources of danger. During the first 2 months of life convulsions are nearly always of cerebral origin; after the third month, while convulsions of cerebral origin are not excluded, the large majority are of a reflex nature. Among the frequently unsuspected causes of convulsions must be placed nephritis. This disease is common in the newly born and the very young infant. Rachitic children are especially liable to convulsive seizures.

Eustace Smith³ points out that **convulsive attacks** similar to those

¹ Boston M. and S. Jour., cxlvii, No. 24.

² Amer. Med., Dec. 13, 1902.

³ Lancet, Jan. 24, 1903.

which occur in rickety or highly neurotic children from reflex irritation may occur in children even as late as the 11th or 12th year, being in them also due to reflex disturbances. The patients are usually members of neurotic families. Instead of at once labeling these cases epilepsy, great care should be taken to discover a possible exciting reflex cause. The seat of the trouble is usually in the alimentary canal. True epilepsy is not so apt to begin during a temporary disturbance of digestion.

Schuitzer¹ regards Balint's dietetic treatment of **epilepsy** merely as a useful addition to our present therapeutic measures. This diet consists of milk, butter, eggs, bread and fruit, with the addition of 2 grams of sodium chlorid and 3 gm. of sodium bromid each day.

F. J. Campbell² has seen a boy of 13 years presenting a history of undoubted **epileptic convulsions** extending over several years, and increasing in frequency till they occurred daily or several times a day. Circumcision for phimosis and balanitis was followed by complete relief without the use of any other measures. Ten years have now passed since the operation.

G. J. Winter³ has collected 213 cases of **essential epilepsy** healed by resection of the sympathetic nerve; 6.6 % were cured, 13.9 % much improved, 18.9 % temporarily improved, 54.9 % showed no change and 7 died—none from the operation per se. These results compare favorably with those obtained in 8000 cases treated medically. At Bellefield only 1.72 % were cured and 3.5 % improved. At Bethel, 7.7 % were cured and 22 % improved.

J. P. Crozer Griffith⁴ discusses the various types of cerebrospinal fever and gives illustrative cases. Among these was a malignant case, in which the child was taken ill suddenly with persistent convulsions and died on the second day. Examples of the chronic and of the mild forms respectively were observed in a brother and sister of this patient, ill at the same time. The diagnosis in the malignant and in the mild cases could not possibly have been made without this coexistence of an undoubted case of the disease. In another family epidemic, one very mild case complicated by pneumonia could never have been recognized had it not been for the coexistence of the other cases in the family.

Robert D. Rudolf⁵ finds that **Kernig's sign** may be obtained in healthy adults, never in healthy children. It may be caused by mere recumbency lasting for days or weeks, and is naturally present in spastic conditions and in muscular hypertonus.

A. H. Davisson⁶ and D. J. McCarthy report a case of **transverse myelitis** in a newborn infant 8 weeks old. There was complete flaccid paralysis of all cerebrospinal muscles below the level of the second and third dorsal segments, with loss of sensation and all reflexes, but without trophic change or wasting. The bowels were moved only by enemas, and there was the incontinence of retention of urine. The child had been born by a difficult breech-presentation. The paralysis was first

¹ Neurolog. Centralbl., Aug. 1, 1902.

² Amer. Med., Feb. 14, 1903.

³ Arch. f. klin. Chir., Bd. Ixvii, 4.

⁴ Jour. Am. Med. Assoc., Jan. 17, 1903.

⁵ Amer. Med., iv, No. 19.

⁶ Phila. Med. Jour., Feb. 21, 1903.

noted at the fourth week, but owing to the mother's illness it was impossible to say whether it had existed from the first. At autopsy there was found flattening of the dorsal cord from the second to eleventh dorsal segments. The remainder of the cord appeared normal. From the size of the pial tube it was evident that the dorsal cord had originally been of normal caliber, and that the flattening was not due to an error in development. Sections of the cord, owing to an accident, were not satisfactory, but showed evidence of hemorrhagic extravasation. It was not possible to decide whether the condition had resulted from an accident at birth or whether it had developed during the latter months of pregnancy, after the cord had attained its approximate size. [This case, which came likewise under our personal observation, is an instance of a very unusual condition. But few cases appear to be reported in medical literature.]

Rolly¹ reports 3 cases in infants of an **abnormal proliferation of the connective tissue about the central canal of the spinal cord** leading to abnormal development of the canal. Two of the infants were atrophic, and had shown spasticity of the muscles since birth. The condition closely resembles syringomyelia.

Köster² discovered an **infectious origin** for 86 out of 121 cases of **chorea minor**—over 71 %. Besides endocarditis and articular rheumatism, tonsillitis, bronchitis, laryngitis, otitis, influenza, and acute rhinitis either introduced or accompanied the choreic process. Endocarditis and rheumatic fever were present in 21 % of all cases.

Huber³ reports a case of **brachial monoplegia** in the course of **chorea minor**. Paralysis was first noticed during convalescence, but in less than 3 weeks the signs of motor disturbance disappeared, showing that it was simply functional in character. This condition may be ascribed to the exhaustion of the cortical cells in the motor area of the brain.

Richon⁴ discusses the mortality of **Sydenham's chorea**, and finds it from 2 % to 3 % according to French statistics. The mortality is greatest between the ages of 12 and 14 years (Charcot). Death may be due to pulmonary complications, to septicemia, or to the severity of the choreic process. Patients die of nervous exhaustion or from progressive weakness of the heart-muscle; exceptionally from embolism, cerebral hemorrhage, pericarditis, or phlebitis. In the first case observed the child died 24 hours after an attack of apoplexy. The autopsy showed subarachnoid edema with thickening of the meninges. Another case died of septicemia with ulcerative endocarditis of the mitral valve. In the author's opinion we must look to the cerebrospinal axis as the point of origin of the severe motor disturbances.

Comby⁵ gives the results of **treatment in 240 cases of chorea** in the past 8 years. Of these, 90 were mild and were treated merely by rest in bed, milk and vegetable diet, and the wet pack. Seventy of 150

¹ Deut. Zeit. f. Nervenheilk., Bd. xxi, 1902.

² Münch. med. Woch., Aug. 12, 1902.

³ Arch. of Ped., April, 1903.

⁴ Rev. d. Mal. d. l'Enf., xx, 1902.

⁵ Gaz. hebdom. de Méd. et de Chir., Jan. 5, 1902.

cases were treated with antipyrin, 54 with arsenic, and 6 with chloral, salophen, etc. Antipyrin should be given in large doses—0.50 gm. ($7\frac{1}{2}$ grains) for each year of age. Oliguria, anuria, erythema, and vomiting may occur, especially in summer, owing to excessive perspiration. In cases on antipyrin or arsenic the diet should be milk. Comby considers the former drug more efficacious.

Jacques Traversier¹ considers *cerebrin* (prepared according to Constantin Paul's method) an efficacious remedy in the treatment of **chorea**, if used hypodermatically.

Lawrence W. Strong² summarizes the results of his observations on **gastric tetany**: (1) The condition is a symptom-complex, indicative of increased nervous irritability, probably central in location. (2) The spasm is a reflex phenomenon set loose by mechanical stimulation, as vomiting or lavage, with possibly direct action in case of pressure on peripheral nerve-trunks. The antecedent nervous irritability is essential in its production. (3) The chief factor in diagnosis is the muscular spasm itself, affecting the arms in a characteristic manner. (4) The etiology of the underlying nervous excitability is unknown. The theory of intoxication is the only adequate explanation.

Solovieff³ has observed an undescribed condition in 2 cases of **tetany**. It was noticed that the lower intercostal spaces on the left side were drawn in with each heart-beat. Radioscopy revealed that the left half of the diaphragm contracted with each systole while the right half was passive. Palpitation was the only subjective symptom.

Finkelstein⁴ presents some interesting features in connection with **latent tetany**, a condition characterized only by hyperexcitability of nerves and muscles. (Erb's sign). He has observed this, with or without other signs of tetany, in 30 % of infants fed on cows' milk, but never in infants fed on breast-milk, farinaceæ, broths and eggs. In the latter class Erb's sign may be obtained if the serum of cows' milk is added to the diet. In infants affected with latent tetany, Erb's sign disappears or diminishes when cows' milk is replaced by breast-feeding or farinaceæ and eggs. Finkelstein concludes that under the influence of cows' milk feeding a disturbance of metabolism results, manifested by a more or less active neuromuscular hyperexcitability, with or without frank tetany. The mechanism has yet to be elucidated.

Barret⁵ has collected 42 cases of **exophthalmic goiter** in children between $4\frac{1}{2}$ and 15 years. The symptoms do not differ materially from the adult type of the disease; the exophthalmos is sometimes less marked and may be unilateral. Tremor is uncommon, but **chorea** frequent [?]. There is great irritability of character. The onset is apt to be sudden, and the cardiac phenomena the first to attract attention. The duration of the disease is shorter in children, 2 to 3 years being the limit.

¹ Gaz. hebdom. de Méd. et de Chir., Sept. 25, 1902.

² Boston M. and S. Jour., Nov. 20 and 27, 1902.

³ Rousskii Vratch, May, 1902.

⁴ Bull. méd., 1902, p. 683.

⁵ Jour. de Méd. et de Chir. Pract., July 10, 1902.

Gowers¹ emphasizes the fact that in primary affections of the muscles classed as "myopathy," "idiopathic muscular atrophy," and "muscular dystrophy" we may have not only increase in the size of the muscles due to interstitial growth (pseudohypertrophic paralysis), but also decrease, or normal size. The muscles may be weak and large, weak and normal in size, or weak and small. The constant element is muscular degeneration which ultimately becomes general, a true "abiotrophy," due to defective vital endurance. He reports a case of **myopathy**, with purely **distal** distribution of the affection in the limbs, the muscles near the trunk being normal. The frontal and orbicular muscles were especially affected, as were the sternomastoids.

DISEASES OF THE SKIN.

Van Harlingen² reports 3 cases of **creeping larvas in the human skin**, 2 of them in children. The lesion in one case consisted in a line of small vesicles, resembling in a magnified degree the furrow made by the itch insect, and 4 inches long. In the second case there was a flat red narrow line, resembling the edge of a circinate erythema, and spreading rapidly around the foot. The parasite causing this curious condition has not been isolated.

So far as the lesions of the skin in **erythema nodosum** are concerned, Kushner³ considers that this disease cannot be separated from erythema multiforme. There is a symptomatic and an idiopathic form; the latter is a form of infection peculiar to childhood and it usually runs a benign course without severe complications. It is not right to consider the disease an early expression of tuberculosis.

Heubel⁴ reports the cases of two children who were fed exclusively on the milk of one cow; coincidentally, they became affected with extensive **eczema**. Investigation showed that the cow was receiving a large quantity of salt. On suspension of this milk the eczema rapidly healed. On resumption of the milk later, it did not return. When salt was again fed to the cow, the eczema returned. Later, an eczema in one of the children was traced to a like source. No treatment was employed.

J. G. Rey⁵ states that the greater number of acute and chronic **eczemas in infancy** occur in connection with affections of the gastrointestinal tract, and are benefited by internal treatment directed to this end. This form of eczema is peculiar to infancy and must be differentiated from the purely ectogenic, parasitic, and artificial eczemas occurring in later childhood. The treatment of this form of eczema is essentially dietetic and in the line of intestinal disinfection. External treatment may become necessary if secondary infection occurs and the disease becomes thoroughly established. Strauss⁶ combats this view, considering **eczema** essentially a catarrhal affection of the skin, requiring local treatment.

¹ Brit. Med. Jour., July 12, 1902.

² Arch. f. Kinderheilk., Bd. xxxvi.

³ Jahrb. f. Kinderheilk., Bd. lvi.

⁴ Am. Jour. Med. Sci., Sept., 1902.

⁵ Münch. med. Woch., Aug. 5, 1902.

⁶ Ibid.

TUMORS.

L. Moquio¹ describes a case of **double hydatid cyst** in a child of 12. The onset of symptoms was sudden, resembling colitis. A few days later, with subsidence of these symptoms, jaundice developed and a tumor appeared below the liver, which was at first thought to be renal. Operation revealed a hydatid cyst with enormously dilated bile-ducts. The cause of this dilation, while not apparent at operation, was found, at autopsy, to be a second cyst within the liver which was pressing on the bile-ducts.

Rabé² reports a case of **primary spindle-celled sarcoma of the vagina** in an infant of 16 months. The whole vaginal surface was affected. The tumor consisted of polyps, some sessile, some hanging from a long pedicle which caused dysuria by pressure on the bladder. The uterus was not affected.

J. C. Cook³ reports an **angiosarcoma** in a child aged $3\frac{1}{2}$ years attached and apparently springing from the right kidney. The lower poles of the kidneys were found to be joined so as to form a horseshoe mass. The tumor with kidneys attached weighed 7 pounds. The omentum and the iliac mesentery contained metastatic growths, but no other metastases were found. The child died 2 months after the disease was first noticed.

Follet and Sacquépéé⁴ report an **intracranial angioplastic sarcoma** situated just over the pituitary body in a child of 9. Death occurred in 3 months from inanition, with general progressive atrophy and vomiting of all food during the last month.

Two cases of **cerebral glioma** coming to autopsy have been recorded by Friedjung;⁵ he considers that tonic convulsions, tremor, and nystagmus are valuable symptoms.

Samuel W. Kelley⁶ reports 2 cases of **dermoid cyst** in children, successfully removed by operation. One involved the testicle in a boy of $2\frac{1}{2}$ years; the other, the ovary in a girl of $7\frac{1}{2}$ years.

THERAPEUTICS AND TOXICOLOGY.

E. W. Mitchell⁷ considers that going barefooted in summer is one of the most useful measures for furthering the **hardening process**. In the general management of children who "take cold" easily, the mistakes most frequently to be corrected are the keeping of apartments too warm, having the sleeping rooms insufficiently ventilated, and making the child wear too much clothing.

In examining 34 children brought up by the so-called "**hardening process**," Hecker⁸ has found that it frequently entails an exaggerated tendency to colds, sore-throat, and respiratory affections, also anemia, neurasthenia, acute and chronic recurring intestinal affections, etc.

¹ Resista Méd. del Uruguay, vi, No. 2.

² Arch. d. Méd. d. Enf., v.

³ Jour. Am. Med. Assoc., March 28, 1903.

⁵ Arch. f. Kinderheilk., Bd. xxxv.

⁴ Arch. d. Méd. d. Enf., v.

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⁶ Jour. Am. Med. Assoc., Feb. 14, 1903.

⁷ Arch. of Ped., Nov., 1902.

⁸ Münch. med. Woch., Nov. 18, 1902.

After the first year of life, hardening measures may be commenced, though very gently and gradually, and strictly individualized. The throat should not be wrapped up. Cold sponging once a day is better than cold douches for children, and should never be used without a preceding medical examination. During extremely inclement weather children should be kept indoors, and the windows in sleeping apartments should not be kept wide open except in summer and in mild climates. [The value of Hecker's advise cannot be too much emphasized. Much harm is often done by injudicious efforts at "hardening" as it is commonly understood.]

Assmus¹ uses a **diaper** made of bog-moss enclosed in a double thickness of mull. This moss has an absorbing capacity equaling sixteen times its own bulk. It can be impregnated with deodorizing material, and obviates the necessity for such frequent changes of the diaper. These cushions are already commercially supplied in Berlin.

A. C. Cotton² discusses the anatomic effects of **tight diapers** upon the infant's plastic pelvis. He believes it is a distinct factor in the production of the justominor pelvis in women. The mass of inelastic material between the thighs may also act as a fulcrum over which the femora may be bent and genu valgum produced. As a substitute he advocates absorbent cotton pads retained by a T-bandage, or a triangle of cheese-cloth secured to the shirt before and behind by safety pins. He illustrates the results of tight diapers by radiographs. [The danger of bowing of the legs from the use of too thick a diaper is a real one. We have seen the deformity produced in this way.]

P. L. Lord³ investigated the effect of the **habitual use of tobacco in school-boys**, especial care being taken to eliminate prejudice. Forty boys were examined, 20 tobacco users, and 20 abstainers from tobacco. Of the smokers, not one had a good memory. None was "excellent" in deportment; 7 were under constant subjection for bad behavior. None appeared to be in excellent health. The average efficiency of the boys who used no tobacco was 95 %.

N. G. Price⁴ considers that **heroin possesses antispasmodic properties** more potent than the bromid and the belladonna group of remedies. In the absence of cumulative symptoms, he finds no objection to its use, even under the age of 2 years, in doses of $\frac{1}{240}$ of a grain.

H. C. Cadman⁵ reports a case of **acute plumbism** in a breast-fed infant 5 weeks old. The symptoms were at first interpreted as an unusual form of indigestion with constipation. The infant improved when taken from the breast. On attempting to resume feeding, it was found that the mother had been using a piece of lead over the nipple, the skin of the nipple looking sodden and white as it does after application of lead lotion. As lead was detected in the infant's stools, the diagnosis was established.

¹ Deut. med. Woch., Bd. xxix, No. 10.

² The School Jour., Feb., 1903.

³ Arch. of Ped., Feb., 1903.

⁴ Phila. Med. Jour., Feb. 14, 1903.

⁵ Lancet, Nov. 20, 1902.

PATHOLOGY AND BACTERIOLOGY.

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THE work in pathology and bacteriology during the last year has been along well-established lines, and, while little of commanding importance has been achieved, the general trend of the work has been progressive. The search for the supposed parasite of carcinoma goes on, but apparently with less energy than a year or two ago. The failure of all parasites hitherto described to withstand the onslaughts of the critics has damped enthusiasm and has shaken the belief in a parasitic cause. The editors of this section are entirely unconvinced; they, moreover, strongly question the validity of the theory, and think that a parasite is not necessary for the production of carcinoma. It is, of course, not impossible that they may at any time be shown to be mistaken.

The important question raised by Koch in his memorable address at the Tuberculosis Congress in London, in 1901, continues to be the subject of earnest study, but the literature of the last year may be said to have contributed "nichts Neues." In some respects Koch's contention of the innocuousness of bovine tuberculosis for man has found a little support; but this innocuousness is relative only; it varies much in different cases, and there can be no question of the intercommunicability of the two forms of the disease. The weight of evidence favors the view that human tuberculosis and bovine tuberculosis are but slightly different manifestations of one and the same disease, and there is, therefore, no reason why the legislation founded on the generally accepted theory of the communicability of tuberculosis from cattle to man through the medium of milk and meat should be abrogated and unnecessary chances taken.

The time heretofore devoted to the search for bacterial causes of disease seems at present to be given largely to search for microscopic animal parasites. So far as we can survey the field, the following are well-authenticated diseases produced in man by microscopic animal parasites: Malaria, filariasis, psorospermiasis, trichiniasis, and trypanosomiasis. During the last year special interest has centered in trypanosomiasis, which has acquired much importance because of its asserted relationship to sleeping-sickness, kala-azar, and other ill-understood tropic diseases, and of the important literature of which we present below a brief abstract. Suggestive work has been done also in connection with smallpox and yellow fever. The studies of Councilman and his

pupils have attracted general attention and command admiration for their conscientiousness. But—has the case been proved? The editors of this section had the good fortune to hear Dr. Councilman's admirable presentation of his thesis, and cannot deny that the bodies described are peculiar and perhaps permit being interpreted as parasites. Yet the very similar bodies found in carcinoma are not considered parasitic by many pathologists, among them conspicuously those of the Harvard school, and if the one be denied, we see no good reason for accepting the other. The parasitic nature of the disease is unquestionable, but with regard to Councilman's, as well as other supposed, parasites, we can only say "not proven." The work of the Yellow Fever Commission of the United States Public Health and Marine-Hospital Service, of which we give an account below is of extreme interest, but the attitude of the impartial inquirer cannot be other than one of patient hope.

Of larger parasitic invasions, *uncinariasis* (the hookworm disease) deserves special mention. In the YEAR-BOOK for last year we presented an account of the organisms together with an abstract of the recent American cases collected and analyzed by C. W. Stiles. Recently A. J. Smith¹ has given an excellent report of the disease in Texas; and C. F. Craig² an account of the disease as it prevails among the soldiers in the United States army. C. W. Stiles,³ directing attention to *Hymenolepis nana* (the dwarf tapeworm), a newly recognized species, suggests that it is probably a somewhat common parasite in this country. It is important that further studies be prosecuted, and that clinicians and pathologists familiarize themselves with the clinical manifestations and the methods of diagnosis of such parasitic invasions to the end that the all-important prophylactic measures may not be neglected.

Research in hematology is largely confined to two phases—the chemico-physical and the chemicophysiologic or biologic properties of the blood. The first was inaugurated by Koryani, whose studies on osmotic pressure and the freezing-point of the blood and the urine have stimulated interesting observations, particularly with reference to Bright's disease and uremia. The results attained, however, have scarcely been as valuable as was hoped. In a physical direction, the investigation of the blood-pressure has advanced the pathology of, as well as the clinical interest in, a variety of diseased conditions.

The chemicophysiologic line of research has concerned itself extensively with the fascinating fields opened by Paul Ehrlich. Hemolysins, cytolsins, agglutinins, precipitins, are being studied in Germany, France, England, and America with interesting results. Considerable impetus was given to the subject during the last year by the Huxley Address delivered by William H. Welch,⁴ and a comprehensive review of the subject was afforded us in the series of papers by Grünbaum.⁵ An unexpected complexity of the blood has been revealed. It has been

¹ Am. Jour. Med. Sci., 1903, cxxvi, 768.

² Ibid., 1903, cxxvi, 798.

³ N. Y. Med. Jour., 1903, lxxviii, 877.

⁴ Johns Hopkins Hosp. Reports, 1902, xiii, 285.

⁵ Lancet, 1903, i, 775, 853, 943, 978, 991.

shown that the blood contains a vast number of active substances that have solvent or immunizing properties, and that it is possible to demonstrate them by the so-called absorption experiments.

Some interest attaches also to certain other of the recent developments in pathology, of which the following are perhaps the most interesting: (1) the investigations of Paine and Poynton, and of Beaton and Walker, and others, into the bacteriology of acute rheumatism; (2) the successful inoculation of a monkey with the bacillus of Ducrey of soft chancre by Tomaszewski; and (3) the reported successful inoculation of a monkey with syphilis by Roux and Metschnikoff.

TUBERCULOSIS.

The Composition of the Tubercle Bacilli Derived from Various Animals.—E. A. de Schweinitz and M. Dorset¹ (Washington) have studied the composition of the tubercle bacilli derived from various animals, extracting the different components with ether, alcohol, and chloroform. Tables showing the relative amount which each extracting agent dissolved are given. The results indicate that as there is a variation in the morphology of tubercle bacilli derived from different sources depending upon their surroundings, so there is a variation in the composition of the bodies of the germs themselves. There is a greater difference between the two human germs—the one attenuated, nonpathogenic for guineapigs, the other almost as pathogenic for guineapigs as the bovine germ—than there is between the virulent human and the bovine and horse bacilli. This loss of virulence in the human bacillus is due to the fact that through its prolonged saprophytic existence and its consequent immunity from the attacks of phagocytes and other protective substances in the animal body, it has acquired the property of producing smaller amounts of poisonous substances, while in the case of the virulent germ, the bovine, horse, and swine germs, which do not produce nearly so large an amount of harmless fatty substances, and consequently contain a lower percentage of extractive matter, the relative amount of poisonous proteid produced is greater.

Pseudotubercle Bacilli in Man.—L. Wrede² (Göttingen) reviews the literature of the pseudotubercle bacilli, and then reports a case of universal miliary tuberculosis in a child of 18 months, coming from an apparently healthy mother. The tubercles contained very many bacilli. Cultures and animal experiments showed these bacilli to be a definite form of pseudotubercle bacillus different from the types thus far described.

Tuberculosis of the Lymphatic Apparatus.—E. Hitschmann and O. Stross³ (Vienna) report a case of tuberculosis of the lymphatic apparatus with the clinical picture of a pseudoleukemia. The sputum contained pus, but never tubercle bacilli. The blood-count was that of a simple anemia (10,000 leukocytes), but suddenly one day a polynuclear

¹ Amer. Med., July 19, 1902.

² Ziegler's Beitr., 1902, xxxii, 526.

³ Deut. med. Woch., May 21, 1903.

leukocytosis appeared, which gradually increased to 42,000 leukocytes. The autopsy revealed chronic tuberculosis and hyperplasia of all the lymph-glands, disseminated tuberculosis of both lungs, slight amyloidosis of the liver; tuberculosis of spleen, kidneys, liver, and bone-marrow. Tubercles and tubercle bacilli were found in all the organs mentioned. Sternberg's "transitions of simple inflammations into typical tuberculous tissue" could nowhere be found. [See also Hodgkin's disease, p. 343.]

Suppuration of Tuberculous Glands of the Neck.—Brunn¹ (Berlin) has examined the pus of 39 cases of tuberculous glands of the neck. Microscopic smears showed 17 to contain streptococci, 8 staphylococci, 2 pneumococci, 1 *Bacterium coli*. In 2 of the streptococcal cases tubercle bacilli were found. The other 11 cases gave negative results to staining tests, and were then examined culturally and by guineapig inoculation. The cultures showed the presence of various organisms, but tubercle bacilli could not be found. All the guineapigs, however, showed extensive tuberculous changes. Brunn concludes from his examinations that cervical-gland abscesses proved to be tuberculous by clinical as well as experimental methods, always present mixed infection with pus organisms, and that streptococci are the most likely cause of the glandular suppuration.

Tuberculous Tumor in the Spinal Cord.—W. K. Hunter² (Glasgow) reports a case exhibiting the rare condition of a single tuberculous focus in the substance of the spinal cord. A child, aged 2 years, had a flaccid palsy of the right arm and leg; the left arm was capable of voluntary movements, but there was some muscular rigidity. The left leg exhibited a slight degree of voluntary movements; on both sides the knee-jerks were exaggerated and ankle clonus was present. At the necropsy typical basal tuberculous meningitis was found, but in addition, in the cervical region of the cord, was a swelling occupying 5 segments, from the second to the seventh cervical; this proved to consist of an oval tuberculous node, occupying the center of the cord, with but a narrow rim of cord tissue around it; it had apparently originated in the right posterior horn.

TYPHOID FEVER.

The Influence of Soil, Fabrics, and Flies in the Dissemination of Enteric Infection.—R. H. Firth and W. H. Horrocks³ (Netley) have performed a number of experiments to determine the influence of soil, fabrics, and flies in the dissemination of enteric infection, and draw the following conclusions, which are applicable to enteric bacilli recently isolated from enteric stools, as well as to old cultures of the organism which have been in the laboratory for many months: The typhoid bacillus when placed into soil does not increase in numbers, grow upward, downward, or laterally. It can be washed through at least 18 inches of soil by means of water, even when the soil is closely packed down. It is

¹ Orth's *Festschrift*, 1903.

² Brain, *Summer*, 1902.

³ *Brit. Med. Jour.*, Sept. 27, 1902.

able to grow in ordinary and in sewage-polluted soil, surviving therein for periods as long as 74 days. The presence or absence of organic nutritive material in the soil does not affect its chances of survival, but an excess or great deficiency of moisture in soil does. From fine dry soil the enteric bacillus can be recovered on the twenty-fifth day after inoculation. From fine sand, kept moist, it cannot be recovered later than the twelfth day after fouling; this is due to its being washed down into the deeper layers by the liquids added. In peat the enteric bacillus appears to die out rapidly. It cannot be recovered after the thirteenth day; from ordinary soil kept damp by occasional additions of rainwater the bacillus can be recovered up to and on the sixty-seventh day. Using occasional additions of dilute raw sewage, it is recoverable up to the fifty-third day. Using dilute sterile sewage, it is recoverable up to the seventy-fourth day. After heavy rainfalls it at once disappears from the surface layers. From a similar soil, allowed after inoculation to become so dry as to be readily blown about as dust, the bacillus can be recovered up to and on the twenty-fifth day. Enteric infective material can be readily translated from dried soil and sand by means of winds and air-currents. In sewage-polluted soil recovered from beneath a broken drain, the bacillus was able to survive up to the sixty-fifth day. From a piece of khaki drill, inoculated with an emulsion of the bacillus and allowed to become quite dry, the microorganism was recoverable up to the seventy-fourth day; from khaki serge, up to the eighty-seventh day; from blue serge, up to the seventy-eighth day. From khaki drill fouled by liquid enteric feces and then allowed to dry, the microorganism was recoverable on the seventeenth day. From a similar fabric fouled by solid or semisolid enteric feces and then allowed to dry, it was recoverable up to the ninth day. It is able to survive in surface soil an exposure to 122 hours of direct sunshine, extending over a period of 21 consecutive days. Ordinary house-flies can carry and convey enteric infective matter from specific excreta or other polluted material to objects on which they may walk, rest, or feed. Such infective matter appears to be attached not only to their heads, but also to their legs, and wings, and bodies. It has not been proved that the enteric bacillus passes through the digestive tract of the fly.

The Dissemination of Typhoid Bacilli through Butter.—Carl Bruck¹ has made a study of this subject, which, however, is purely experimental. It would be decidedly more valuable if it were supplemented with an examination of market-butter for the germs. Three sets of experiments were made. In the first, the author endeavored to discover whether pure cultures of typhoid bacilli, when added to milk, would pass over into the cream and into the butter. In the second, he rinsed the utensils employed with water that had been contaminated with typhoid bacilli. In the third, he contaminated pieces of linen with the stools of typhoid patients, washed the linen in tap water, and with this water rinsed the butter-machine. This experiment was intended to imitate as nearly as possible the natural conditions. In all three experiments a positive

¹ Deut. med. Woch., June 25, 1903.

result was obtained; that is, the typhoid bacilli could be demonstrated in the butter.

Types of Infection Produced in Man by Intermediate Members of the Typhoid-colon Group of Bacilli.—W. Coleman¹ (New York) discusses the intermediate members of the typhoid-colon group of bacilli which produce infections in man, and which are distinguished from the typhoid infections by the Gruber-Widal reaction. He says that the terms "paracolon" and "paratyphoid" are used to designate bacilli of this group which resemble more nearly in biologic characters the colon bacillus on the one hand and the typhoid bacillus on the other. The paracolon bacilli are a group the members of which are culturally alike, but constitute several distinct species, some of which may give rise to typhoidal symptoms in man. The paratyphoid bacillus is a distinct species, culturally unlike the paracolon bacillus, and causes typhoidal symptoms in man. He divides the types of infection into 3 groups: (1) Typhoid type, caused by the paratyphoid bacilli and certain of the paracolons. (2) Epidemic meat-poisoning type, caused by *Bacillus enteritidis* and its allies. (3) Psittacosis type, caused by *Bacillus psittacosis*. The different types are described in detail and cases mentioned in which the different bacilli were isolated.

DYSENTERY.

The Pathology of Chronic Specific Dysentery of Tropical Origin.

—C. F. Craig² (San Francisco) discusses the pathology of the chronic form of acute specific dysentery, of which he has studied 103 cases upon the autopsy table. There are but few acute cases at the United States army hospital, nearly all being of the chronic type. A large proportion are chronic amebic dysentery, but a goodly number belong to the acute specific tropical disease, as proved by the fact that the blood-serum of these cases gives an agglutination reaction with a pure culture of the Shiga bacillus. In discussing dysentery Craig speaks of follicular, diphtheric, and gangrenous forms, but states that these are only different stages of the same process; the disease commencing as follicular and terminating as gangrenous dysentery. Of his cases, 28 were follicular, 70 diphtheric, and 5 gangrenous. He discusses in detail the character of the dysenteric stools, the gross and microscopic pathology of the different stages, and the bacteriology of chronic specific dysentery. He is certain the bacillus of Shiga is the cause of the acute form of the disease, but in the chronic form so many pathogenic bacteria are found that it is difficult to say how much of the pathologic condition is due to Shiga's bacillus. In conclusion he remarks that the term "tropical dysentery," as denoting dysentery due to infection with the ameba, is unwarranted in the sense that amebic dysentery is the only type occurring in the tropics. All of his cases originated in the tropics, and are as much tropic as amebic dysentery.

¹ Amer. Med., Sept. 27, Oct. 11 and 18, 1902.

² Amer. Med., Oct. 11, 1902.

Dysentery Bacillus in Infantile Diarrhea.—Martha Wollstein¹ (New York) states that cases of infection with the dysentery bacillus in infants tend toward the clinical picture of dysentery, with frequent mucous and bloody stools. In some cases of hospital infection, occurring as terminal to other diseases (especially pneumonia), and in other mild cases, the stools may never contain blood, but mucus is present in every case, and usually in large amount. The serum reaction is uncertain during the first week, frequently positive after the sixth day, but it may be absent for 2 weeks. It cannot be relied upon for early diagnostic purposes in infants and young children. The isolation of *Bacillus dysenteriae* from the stools is the only positive evidence of infection during life. The bacilli are present in the stools for a period of from 2 to 3 weeks, but may remain for a longer time. The type of the organism almost invariably found by her in her researches in New York City was the "Manila" or Flexner bacillus.

Reaction of Certain Water Bacteria with Dysentery Immune-serum.—D. H. Bergey² believes that the agglutination reaction with dysentery immune-serum cannot be relied upon in the differentiation of organisms of *Bacillus dysenteriae* group unless we know the limits of the agglutinating power of the serum employed for the particular organism against which the animal has been immunized. The normal serum of the horse, rabbit, and dog contains agglutinins, in relatively small amounts, for a variety of organisms. The immunization of an animal against a particular organism increases not only the agglutinins for that organism, but likewise induces an augmentation of the agglutinins of other organisms which are closely related in their receptor apparatus. Absorption experiments show that the absorption of the agglutinins from a serum, by means of a particular organism, not only removes the agglutinins for the organism employed in the experiment, but also some of the agglutinins for closely related organisms. In the absorption experiments upon dysentery immune-serum, the water bacteria show a more marked influence upon the agglutinins of *Bacillus dysenteriae* (New Haven, for instance) in the serum of an animal immunized against this organism than do the organisms of the Philippine group or those isolated from cases of summer diarrhea. Comparative studies of the biologic characters of the water bacteria show that none of them are true dysentery bacilli. They are similar to the organisms designated pseudo-dysentery bacilli by Lentz and Kruse, and are probably *Bacillus coli communis* and *Bacillus faecalis alkaligenes*.

Shiga Dysentery Bacilli and Serum Reactions in Epidemic Dysentery.—William H. Park and H. W. Carey³ (New York) give the results of their study of an extensive outbreak of dysentery (250 cases with one fatality) that occurred in New York State. From the fatal case they isolated a bacillus almost identical with Shiga's Japan and the Flexner New Haven bacillus. At least two distinct varieties of bacilli have been found in the intestines of those suffering from acute dysentery and colitis,

¹ Jour. Med. Research, 1903, x, 11.

² Jour. Med. Research, 1903, x, 30.

³ Jour. Med. Research, 1903, ix, 180.

which are probably exciting factors in the disease. These two varieties, though resembling each other greatly in most cultural characteristics, yet differ in some (indol-formation and mannit fermentation), and also in their agglutination reaction. Though Martini and Lentz are right, therefore, in their statement that the Shiga type differs from Flexner's Manila-Baltimore type in cultural and agglutination reaction, yet they appear to be wholly wrong in concluding, upon our present information, that one type of organism is a factor in dysentery and the other not. Indeed, bacilli such as those obtained by Deycke from dysentery, in Constantinople, which approached the colon type in cultural characteristics, cannot as yet be overlooked. It seems that it is extremely probable that Shiga, if he carries his cultural and agglutination tests as far as is now known to be necessary in order to differentiate the different varieties, will find that in Japan, as well as in America and elsewhere, not one, but several varieties of this group of bacilli are present. The use of more accurate agglutination-tests in connection with additional culture media has brought to light the fact that in different epidemics the bacilli believed to have excited the disease vary so greatly from the original culture of Shiga that at present we can hardly decide whether a single group is broad enough to comprise all the varieties. It is perhaps more than a coincidence that in most of the epidemics of characteristic dysentery the bacilli found have not fermented mannit. Even if the serum treatment proves of great value we can hardly hope that the bactericidal properties obtained through the infection of animals with one type of culture will be useful in persons suffering from another type.

Experimental Vaccination against the Bacillus of Dysentery.—F. P. Gray¹ (Philadelphia) reports concerning experimental vaccination and serum-therapy against infection with the bacillus of dysentery in guineapigs. He concludes that Shiga's bacillus is the cause of most forms of dysentery in all climates, and of many of the summer diarrheas among infants. Guineapigs are susceptible to experimental infection with *Bacillus dysenteriae*. Its virulence is lessened if cultivated outside the body; by successive passages through animals this virulence can again be increased. This permits the establishment of a uniform degree of virulence, which adapts it for the production of vaccines of uniform activity. The vaccines, suspensions of dysentery bacilli killed by tricresol, suffice to protect guineapigs from a succeeding multiple fatal dose of living dysentery bacilli and to produce in the horse an active immune-serum. This in guineapigs prevents fatal infection with *Bacillus dysenteriae* or intoxication with its vaccine. The bacillus of dysentery resists bacteriolysis by blood-serum to a greater extent than some other members of the colon-typhoid group of bacilli.

SMALLPOX.

The Etiology and Pathology of Smallpox.—During the last year several communications dealing with the etiology and pathology of small-

¹ Univ. Pa. Med. Bull., 1902, xv, 307.

pox have been published, among the more important being those by W. T. Councilman, G. B. Magrath, and W. R. Brinckerhoff¹ (Boston), R. S. Thomson and John Brownlee² (Glasgow), W. Dombrowski³ (Russia), W. T. Howard⁴ (Cleveland), and R. G. Perkins and G. O. Pay⁵ (Cleveland). Councilman, Magrath, and Brinckerhoff direct attention to the original observations of Guarnieri on **the supposed parasite of smallpox** and the later important work of Wasielewski,⁶ and give the results of their own studies, stating that in the lower layers of the cutaneous epithelium, before there is any anatomic evidence of vesicle-formation, small structureless bodies, 1 to 4 microns in diameter, may be found lying in vacuoles. The large bodies are irregular (suggesting an ameboid character), and they may become as large as the nucleus of the epithelial cells; but a definite nucleus in them (the bodies) has not been made out. Soon segmentation takes place, leading to the formation of small round bodies about 1 micron in diameter. These bodies are regarded as living organisms, and the gradual growth and final segmentation as a cycle of their life-history. At the period of segmentation and when most of the intracellular bodies have disappeared, small round or oval ring-like bodies appear in the nucleus. These increase in size, acquire a definite structure, and lead to degeneration of the nucleus. This intranuclear body is regarded as a further stage of development of the intracellular body, and as representing a second complete cycle of development, arising from the spore-like bodies produced by the segmentation of the intracellular body, which pass into the nucleus. The spores produced by segmentation are regarded as the true infecting material of variola. In vaccination of the rabbit and the calf, bodies similar to those met in the first cycle of the smallpox organism have been seen, but the intranuclear forms have not been found. Inoculation in the monkey, however, disclosed both the intracellular and intranuclear forms, whence it is thought extremely probable that in smallpox the complete development of the parasite through two cycles takes place, and that in vaccinia the primary cycle only occurs. It is stated, however, that definite conclusions can only be reached by further study of vaccinia in animals subject to both vaccinia and variola. Thomson and Brownlee describe the organism that they have found and which differs but little from those heretofore described. They believe that similar organisms are found in varicella. **Dombrowski's organism** also resembles in many respects those heretofore described, but differs from Pfeiffer's organism, as well as from Councilman's, in that it does not divide by sporulation. Howard gives the result of a study of **the agglutinating, hemolytic, and endotheliolytic action of the blood-serum in variola**, the study comprising the determining of the action of the blood-serum in variola upon: (1) normal human erythrocytes and leukocytes from vaccinated and unvaccinated individuals; (2) erythrocytes of individuals with variola; (3) leukocytes

¹ Jour. Med. Research, 1903, xi, 372.

² Brit. Med. Jour., 1903, i, 241.

³ Zeit. f. klin. Med., 1902, xlvi, 1.

⁴ Jour. Med. Research, 1903, x, 157.

⁵ Jour. Med. Research, 1903, x, 163, 180, 196.

⁶ See YEAR-BOOK for 1902, p. 371.

of pus in a nonvariolous individual; (4) erythrocytes of the rabbit and the ox; and (5) vascular and serous membrane endothelium of man and the rabbit. The investigation showed that the blood-serum of variola obtained from both fatal and nonfatal cases, early and late in the disease, with and without streptococcus mixed infection, causes agglutination of washed and unwashed erythrocytes of vaccinated and variolous human beings and of the rabbit. This agglutinating property is not affected by heating to 59° C. for 1 hour. Variola serum has little, if any, hemolytic action upon the erythrocytes of normal human beings. The washed erythrocytes of a variolous patient were dissolved by one of two variola serums tested. Variola serum appeared to be inactive upon the washed and unwashed endothelial cells of the rabbit and of man, whence it is concluded that it is probable that the lysogenic effect exerted on the vascular endothelium in the disease is a local one. Perkins and Pay believe that variola is not due to a submicroscopic organism, since the organism (whatever it is) is held back by the pores of a filter which does not restrain organisms that we are able to see; that the organisms described by Dombrowski, Ishagami, and Funck are not organisms, but various forms of cell-degeneration; and that the organism, or some form of it, is certainly present in the contents of the vesicles and pustules, but in a state in which we are unable to distinguish it from the cellular debris. They believe that their work is confirmatory of Councilman's opinion, who finds his organism in recognizable form only in the very early stages of the variolous lesion. In the vesicles and pustules it is believed to be present only as spores, which, being 1 or 2 microns in diameter, are almost impossible of differentiation from the associated debris. Perkins and Pay, having studied **the relation of Streptococcus pyogenes to variola**, state that streptococci are present in all, or nearly all, severe cases of variola which prove fatal, and in many which recover. They may occur in the blood some days, or only a few hours, before death, and they multiply very rapidly after death. They bear no etiologic relationship to variola nor to pustulation of the skin. The probable portal of entry is the bronchial mucous membrane. The streptococci found in the blood and the secondary infections are not identical, but vary markedly in certain constant characteristics, whence it follows that antistreptococcal serum, prepared from one variety of streptococci, is of no special value in combating the symptoms and sequels of variola which are due to streptococci. Perkins and Pay, having studied also **the bactericidal action of the blood-serum in variola and in varioloid**, state that in patients dying from variola in the first 5 or 6 days of the eruption, before the completion of the pustular stage, there is practically no loss of the complement. In patients dying after this time, but still of the variolous infection, in the full pustular stage, there is a loss of complement, in general proportionate to the extent of skin involved. In patients dying after the disappearance of all symptoms directly attributable to variola, death being due to the long-continued suppuration of secondary abscesses, the loss of complement is fairly uniform, and probably of similar origin with that described in wasting

diseases. In light cases, taken early or late, there is apparently no loss. The fact that the addition of normal serum with a high complement content to their antistreptococcal serum inoculations did not seem in any way to decrease the secondary infections from which streptococci could be cultivated, together with the results just indicated, led to the conclusion that the loss of complement has very little to do with the secondary streptococcal infections, but that, on the other hand, these infections, if sufficiently long continued, may lead to a very definite loss. [Although the investigations concerning the alleged parasite of smallpox are extremely interesting, one can only say "not proven." The bodies described by Councilman and others may well be interpreted as degeneration products. The evidence that they are the cause of smallpox is no stronger than that upon which the parasitic theory of cancer is based.]

TRYPANOSOMA INFECTION.

Trypanosomiasis in the human subject, the discovery of which was noted in the YEAR-BOOK for 1903,¹ continues to engage the attention of many investigators. Among the recent important additions to our knowledge have been the reports of cases by Patrick Manson,² A. Maxwell-Adams,³ P. Manson and C. W. Daniels,⁴ W. B. Leishmann,⁵ and C. J. Baker⁶; the finding of the trypanosome in the cerebrospinal fluid and the suggestion of its relationship to sleeping-sickness, by A. Castellani⁷; the discussion on trypanosomiasis at the recent meeting of the British Medical Association, participated in by Manson, Christy, Dutton, Todd, Castellani, Sambon, Low, and Rogers⁸; a report on sleeping-sickness in Uganda, by D. Bruce and D. Nabarro⁹; the results of an experimental investigation of Trypanosoma lewisi (the rat trypanosome) by E. Francis¹⁰; the cultivation of Trypanosoma lewisi by McNeal and Novy¹¹; and a report on trypanosomiasis of horses in the Philippine Islands, by W. E. Musgrave and N. E. Williamson.¹² In 34 cases of sleeping-sickness, Castellani found trypanosomes in the cerebrospinal fluid taken by lumbar puncture during life in 20 cases; in 2 cases they were found in the fluid from the lateral ventricles; and in 1 case in the blood. Bruce and Nabarro found the trypanosome in the cerebrospinal fluid in all of 40 cases that they examined. Castellani believes that the trypanosome is the cause of sleeping-sickness, because the trypanosome is constantly (or almost constantly) present in the cerebrospinal fluid of patients; because, according to his experience, it is never found in the cerebrospinal fluid in other diseases; and because the pathologic changes of sleeping-sickness

¹ Page 334.

² Brit. Med. Jour., 1903, i, 718.

³ Brit. Med. Jour., 1903, i, 721.

⁴ Brit. Med. Jour., 1903, i, 1249.

⁵ Brit. Med. Jour., 1903, i, 1252.

⁶ Brit. Med. Jour., 1903, i, 1254.

⁷ Jour. of Tropical Med., June, 1903; Brit. Med. Jour., 1903, i, 1431.

⁸ Brit. Med. Jour., 1903, ii, 645.

⁹ Reports of the Sleeping-sickness Commission of the Royal Society, 1903.

¹⁰ Bull. No. 11, Hyg. Lab., U. S. Pub. Health and Mar.-Hosp. Serv., Washington, 1903.

¹¹ Contributions to Medical Research, dedicated to V. C. Vaughan, 1903.

¹² Bull. No. 3, Biolog. Lab., Dept. of the Interior, Washington, 1903.

are in favor of its being a trypanosome disease. Manson gives a good discussion of the ascertained clinical features of trypanosome infection in the European and in the native African, and the possible relationship between human trypanosomiasis and trypanosomiasis in the lower animals, and to certain obscure tropical diseases—sleeping-sickness, hyperpyrexial fever of West Africa, and Kala-azar and certain forms of splenomegaly common in the tropics. He is disposed to believe that the trypanosome is probably not the cause of sleeping-sickness; on the contrary, he suggests that kala-azar and those curious and very fatal forms of chronic fever not amenable to quinin and accompanied by enlargement of the spleen and liver, and often by hyperpigmentation of the skin, may be found to be caused by *Trypanosoma gambiense* or some similar parasite. It is presumed that the tsetse fly is the source of infection with the parasite, inasmuch as the area of prevalence of sleeping-sickness and that of distribution of the fly are almost the same. Francis gives a description of the morphology and cycle of development of the trypanosome as well as an account of immunity, susceptibility to infection, the mode of transmission of the disease, and a review of 11 cases occurring in man.

YELLOW FEVER.

The Etiology of Yellow Fever.—An extremely interesting and valuable report on certain investigations bearing upon the etiology of yellow fever has recently been issued by the United States Public Health and Marine-Hospital Service. The report comprises the results of the work of H. B. Parker, George E. Beyer, and O. L. Pothier, who constituted a working party that investigated yellow fever in Vera Cruz from May to October, 1902. By no means the least interesting part of the report is that relating to the sanitary history of Vera Cruz and a synopsis of previous investigations concerning yellow fever. In addition, they give the results of their examinations of the fresh blood of yellow fever patients, comprising the microscopic examination of the native blood and of stained film preparations, the bacteriologic study of the blood, and studies in serum reactions. No noteworthy changes were found on microscopic examination of the blood, and bacteriologic examinations were uniformly negative, except in one case in which the blood taken in the agonal period revealed a bacillus belonging to the colon group. Serum agglutination-tests were undertaken with *Bacillus icteroides* (Sanarelli), *Bacillus typhosus*, *Bacillus dysenteriae* (Shiga), and *Bacillus coli communis* in dilutions of 1 to 40, with uniformly negative results. Finally, of special interest is the fact that bacteriologic examination of the blood and the organs of subjects dead of yellow fever, the examinations being undertaken within 1 hour of death, revealed the entire absence of vegetable organisms. Such being the case, the committee ceased their examinations of the blood and organs, and turned their attention to the mosquito, *Stegomyia fasciata*, and a more complex series of organisms, the protozoa—with results that they express in the following conclusions: (1) The bacteriologic examination of the blood of cases of yellow fever

during life, and the blood and organs at autopsy performed immediately after death in uncomplicated cases, is negative. (2) *Stegomyia fasciata*, when contaminated by feeding on a case of yellow fever 41½ hours after the onset of the disease and subsequently fed on sugar and water for 22 days and 1½ hours, can, when permitted to feed on a nonimmune individual, produce a severe attack of the disease. (3) *Stegomyia fasciata* contaminated by feeding on a case of yellow fever, and after varying periods killed, sectioned, and appropriately stained, presents with regularity a protozoan parasite, *Myxococcidium stegomyiae*, that can be traced through a cycle of development from the gamete to the sporozoite. (4) *Stegomyia fasciata* fed on blood from a case of malarial fever, on normal blood, or artificially fed, does not harbor the parasite indicated in conclusion (3). **The alleged parasite of yellow fever**, for which the commission propose the name *Myxococcidium stegomyiae* (Parker, Beyer, Pothier), is provisionally placed among the hemospordias. Its schizogonic stage is as yet unknown. In its sporogenic stage it is a fusiform nucleated body, 3 to 4 μ long by 1.5 to 2 μ broad—found in the lumen of the stomach and the esophageal diverticulum about 3 days after the mosquito has bitten a yellow fever patient. This is succeeded by a globular stage (oocyst?) in the esophageal diverticulum, where it is embedded in an albuminoid mass of undetermined origin and nature. This reaches maturity and breaks up into numerous elongate-oval bodies (sporoblasts?) 3 μ long by 2 μ broad, which enter the cells of the salivary gland, where, coming to rest (spores?), they break up into numerous excessively minute bodies (sporozoites?), which would naturally be discharged by the mosquito when in the act of taking food. J. C. Smith¹ contends that he has not received sufficient credit in the report for working out the sexual life-history of the supposed parasite in the body of the mosquito. [As a bit of work these investigations are extremely interesting and they appear to follow naturally on the epoch-making researches of the lamented Reed and his associates. Whether the new organism is really the causative factor in yellow fever or whether it is destined to be added to the already fairly long list of supposititious organisms remains to be seen. Analogy nevertheless warrants us in assuming that ultimately the cause of yellow fever will be demonstrated to be a protozoon rather than a bacillus. Assuredly the work should be proved; its importance and possibilities suggest its being subjected to the strictest scientific inquiry.]

While correcting the proof of this section, there came under the writer's notice an article that seems to throw serious doubt upon the conclusions of Parker, Beyer, and Pothier. Carroll² claims that the fusiform stage of the so-called ***Myxococcidium stegomyiae*** is not in any way connected with the **transmission of yellow fever**, but is, in reality, a blastomycete, or yeast-cell. It was found by him in both male and female mosquitos that had purposely been fed on over-ripe banana to which a pure culture of a wild yeast had been added in the laboratory. The organism was not found in mosquitos of the genus

¹ Science, 1903, xviii, 460.

² Jour Am. Med. Assoc., Nov. 28, 1903.

Stegomyia that had bitten yellow-fever patients, when these insects had been fed only on blood, dry sugar, and water. This was also true of mosquitos that were known to have reproduced the disease in human beings. [Until a satisfactory refutation of Carroll's statements appears, we must assume that the members of the Working Party are mistaken.]

MISCELLANEOUS INFECTIONS.

The Etiology of Acute Rheumatism and Allied Conditions.—R. M. Beaton and E. W. A. Walker¹ (London) give the result of their investigations concerning the etiology of acute rheumatism, which is largely confirmatory of the earlier work of Triboulet, Wassermann, and especially Paine and Poynton.² Beaton and Walker obtained a micrococcus from 15 cases—8 cases of acute rheumatism, 3 cases of chorea, and 4 cases of acute endocarditis in rheumatic subjects. They agree with those observers who maintain that a particular microorganism is constantly associated with acute rheumatic lesions; that this microorganism can be cultivated on artificial media outside the living body; and that on inoculation into animals it gives rise to the characteristic lesions of the disease, and can again be isolated from these lesions. The microorganism, although it resembles a streptococcus, is believed to be specifically different from the ordinary streptococcus. The writers hold that the bacterial specificity of acute rheumatism has been satisfactorily established, but that its toxic specificity remains to be investigated—a subject upon which they are engaged. F. Kollmann³ cites a large number of cases from the literature indicating the **infectious nature of acute articular rheumatism**, and reports 2 personal observations of his own. [The infectious or bacterial nature of acute rheumatism is, of course, no longer open to question. But we have yet to determine whether all the joint-affections commonly classed as acute rheumatism are etiologically alike—which is very doubtful. It appears, however, that in a considerable proportion of cases a diplococcus, such as that described by Paine and Poynton, and Beaton and Walker, is the active agent. In other cases the causative factor is probably a microorganism capable of inducing lesions in different parts of the body, including the synovial membranes.]

The Pathology of Acute Rheumatoid Arthritis.—W. Hale White⁴ (London) states that the pathologic changes in acute rheumatoid arthritis consist of a chronic inflammation of the synovial membrane together with a thickening of the tissues outside the joint. The pitting of the cartilage is slight and secondary to the changes in the synovial membrane. The cartilage itself is healthy and the affection of the bone is slight and due to perforation of the cartilage by the thickened synovial membrane. There are no bony or cartilaginous outgrowths. White believes that the disease is probably of microbial origin,—a diplococcus was found in the joint lesions in his case,—and other observers have

¹ Brit. Med. Jour., 1903, ii, 237.

² Münch. med. Woch., July 1, 1902.

³ See YEAR-BOOK for 1902, vol. i, p. 366.

⁴ Guy's Hosp. Reports, 1903, lvii, 9.

found other microorganisms, but the specific microorganism has not yet certainly been isolated.

Streptococci in the Throats of Scarlatinal Patients.—G. H. Weaver¹ (Chicago), from a detailed study of the vitality of bacteria from the throats of scarlet fever patients, with particular reference to streptococci, reaches the conclusion that streptococci are almost always, if not constantly, present in the throat in cases of scarlatina. In the early stages they are usually present in very large numbers, becoming less numerous as the disease progresses. These streptococci resist drying as long as the other bacteria usually present, and they often outlive all other forms, being alive as long as 90 days after the material is collected. They remain alive for a long time in milk. Streptococci from scarlatinal anginas are not different from streptococci from other sources, so far as cultural and morphologic peculiarities are concerned.

Bacteriologic Blood-examinations in Scarlet Fever with Special Reference to Streptococcemia.—L. Hektoen² (Chicago) has made bacteriologic examinations of the blood during life, of cases of scarlet fever, with special reference to general streptococcus infection in this disease, and concludes that streptococci may occasionally be found in the blood of cases of scarlet fever that run a short, mild, and uncomplicated course; that streptococci occur with relatively greater frequency in the more severe and protracted cases; but even in these spontaneous recovery may take place; and, finally, that streptococcemia may not be demonstrable in fatal cases of scarlet fever. The theory that scarlet fever is a streptococcus disease does not receive any direct support from his work.

Examinations Concerning Streptococci.—H. Aronson³ (Berlin) has always been of the opinion that there are no specific differences between the streptococci of different diseases, as any streptococcus may produce articular or cardiac lesions in the horse, and as the serum of a horse immunized with a definite culture protects against all streptococci and agglutinates any of them. These examinations referred to cultures which had been made highly virulent for horses by previous passage through mice and rabbits. To prove that streptococcal cultures cannot be differentiated from each other by the agglutinating test, as has been claimed by others, he experimented with 27 different cultures without previous intensification, and reports the following results. Even using the most delicate biologic methods he was unable to separate the different varieties of human streptococci. Microscopic examinations, culture tests, agglutinating methods, and immunization failed him in determining the origin of the streptococcal cultures. On that account he insists that the streptococcus cannot be considered as the cause of a typical and peculiar infection, as, *e.g.*, scarlet fever, but holds, instead, that all the serious complications of this disease are due to it. It cannot, therefore, yield a specific scarlet fever serum, any streptococcal serum being an active

¹ Jour. Med. Research, 1903, ix, 246.

² Jour. Am. Med. Assoc., March 14, 1903.

³ Deut. med. Woch., 1903, xxix, No. 25.

agent in the disease. He intends, however, to add to his serum which is drawn from horses immunized with different and highly virulent cultures, a serum from a horse immunized with streptococcic cultures taken directly from man.

Pneumococcic Arthritis.—J. B. Herrick¹ (Chicago) discusses the arthritis due to the diplococcus of Fraenkel. He finds it more common in men than in women, occurring usually during or shortly after a croupous pneumonia; but it may be primary in the joint, inducing toxemia with severe and even fatal constitutional symptoms. Pulmonary localization may or may not occur. Previous changes from trauma, rheumatism, or gout favor the disease. The lesions may be limited to the synovia, or may involve the cartilage and bone. The periarticular structures may become involved. The subacute cases are sometimes highly destructive to the joint, and the same is true of some of the acute ones. The lesions are usually monarticular (61.5 %), the larger joints being oftenest involved, especially the knee-joint. The joints of the upper extremities are affected a little oftener than those of the lower, but the difference is insignificant. Exploratory aspiration with bacteriologic examination of the fluid is the only means of recognizing the pneumococcic nature of the inflammation. Gonococcic arthritis and periarthritis have to be carefully excluded, as well as the arthralgias following pneumonia.

A case of septicemic glanders in the human subject, an extremely interesting and unusual case, is reported by W. Coleman and J. Ewing² (New York).

Histologic Changes of Lepromatous Skin.—K. Sakurane³ (Osaka) describes the histologic cutaneous changes in the cases of 8 lepers. Six of them had mixed leprosy; 2 were suffering with the purely nervous type. In 6 smear preparations contained the lepra bacillus; in one of the others it could be found in sections; they occurred singly and in groups. Infiltrations of round and spindle cells could be found surrounding blood-vessels, hair-follicles, and sweat-glands. The infiltrations were focal, but not so much so as in tuberculosis. Sections of anesthetic skin did not show any other changes, but in one case infiltrations could be found in the cutaneous nerves. But few elastic fibers could be found within the infiltration foci. Many giant-cells were present; they are probably derived from the blood-capillaries and lymph-vessels. Infiltration and proliferation were noted in some of the blood-vessel-walls; also changes of endothelial cells into cylindric cells.

Chronic Infection and Subinfection by the Colon Bacillus.—G. A. Charlton⁴ (Montreal) gives the result of a study of chronic infection and subinfection by the colon bacillus, with particular reference to a remarkable anemia produced by repeated injections of cultures of a colon bacillus of low virulence, an anemia that is not quite comparable with any of the classic forms seen in man. In some respects it is strikingly like pernicious anemia—namely, in the very great diminution in the

¹ Am. Jour. Med. Sci., 1902, cxxiv, 12. ² Jour. Med. Research, 1903, ix, 223.

³ Ziegler's Beitr., 1902, xxxii, 563.

⁴ Jour. Med. Research, 1902, viii, 344.

number of erythrocytes, the marked poikilocytosis, and the appearance of nucleated red corpuscles; but it differs from pernicious anemia in the fall of the amount of hemoglobin being proportionate to the decrease of the red corpuscles; in the absence of a distinct siderosis, or increased presence of iron, in the liver; in the absence of any clear evidence of inflammatory or other disturbances of the digestive tract, and of well-marked changes in the bone-marrow. Whether employment of other strains of the colon bacillus leads to a picture more clearly resembling pernicious anemia, or whether, again, the employment of bacterial toxins rather than the pure attenuated cultures, will give different results, has not yet been determined. [Charlton's observations are of value, as indicating one method—namely, that of "subinfection" by the ordinary bacterium of the digestive tract—whereby a very definite grade of anemia may be produced. They strengthen the toxic theory of pernicious anemia—at least that phase of it which ascribes the anemia to intestinal infection or intoxication.]

The Distribution of the Colon Bacillus of Escherich and of the Sewage Streptococci of Houston in Polluted and Unpolluted Waters.

—C. E. A. Winslow and M. P. Hunnewell¹ (Boston) review the previous communications bearing on the distribution of the colon bacillus in water, and give the result of their examination of 157 samples of water from apparently unpolluted sources, and of 50 samples of water from obviously polluted sources. After some discussion of the methods of analysis, they state that by the methods employed *Bacillus coli* is very rarely found in 1 cc. samples of unpolluted waters. In 157 samples typical colon bacilli appeared only 5 times, and paracolon organisms 5 times more. This confirms the observations of Smith and the English bacteriologists as to the parallelism between the numbers of colon bacilli present in a water and the extent of its contamination. Streptococci and staphylococci, as observed by Houston and Horrocks, may be associated with sewage pollution. While they occurred in only 3 of the 157 samples of unpolluted waters, they were isolated from 25 out of 50 of the waters of the polluted class, and they were probably present in some of the other samples. It is believed to be probable that the two groups of sewage organisms normally occur together, and that the presence of either is significant. It is desirable that the occurrence of the streptococcus, as well as the colon bacillus, should be noted in sanitary water analysis. With these two apparently characteristic sewage forms, and with perhaps also *Bacillus sporogenes*, the bacteriologist is in a better position to draw reliable conclusions as to the antecedents of a water sample than has heretofore been the case.

The Significance of the Colon Bacillus in the Drinking-water.—

W. G. Savage² (Cardiff), after referring to the significance of *Bacillus coli communis* and the history of its occurrence in drinking-waters, presents studies of his own and concludes as follows: (1) In estimating the importance of *Bacillus coli* in a sample of water the particular kind of water must be carefully considered, also the exact part of the system from

¹ Jour. Med. Research, 1902, viii, 502.

² Jour. of Hyg., 1902, ii, 320.

which the sample is taken. (2) The number of the organisms present is an essential factor, but arbitrary standards of the number of this organism allowable per liter are of but little value and are fraught with considerable possibilities of error unless this particular kind of water and the local conditions are considered in every case. (3) Waters which show no *Bacillus coli* in 50 cc. are of a high degree of purity, and therefore the proved absence of this organism in this amount, and still better in larger quantities, is of great value. (4) *Bacillus coli* should be absent from at least 50 cc. of spring water; possibly from greater amounts. (5) In upland surface water the presence of *Bacillus coli* in 40, 10, or even 2 or 1 cc. means contamination, but not necessarily a contamination which it is essential to prevent. It may be from contamination with the excreta of animals grazing on the gathering areas, and is by no means necessarily from sewage or other material containing specific organisms of infection. Further, there is no evidence that an amount of such animal contamination sufficient to cause a considerable number of colon bacilli to the liter to be present in the water, is harmful. If colon bacilli are present in numbers greater than 500 per liter (or even in that amount), such a water is suspicious, as it is rare to get so many in a water purely from the kind of animal contamination indicated, and further investigation is desirable. In filtered samples the number is, as a rule, considerably reduced. (6) Chemic analysis cannot be considered a delicate method of detecting organic contamination, because it may fail with many waters in which pollution is undoubtedly taking place. (7) In surface wells colon bacilli in large numbers indicate surface or other contamination generally very undesirable, if not actually dangerous. A knowledge of the position and possibilities of contamination is very desirable in giving an opinion as to the purity of the water.

Continued Fever Due to *Bacillus Enteritidis* (Gärtner).—Craig¹ (Dublin) reports a case of continued fever in which typhoid fever was diagnosed. The Widal reaction was positive in a 1:25 dilution. Death occurred on the eleventh day. The autopsy revealed an enlarged spleen and a condition of inflammation of the mucous membrane throughout the length of the small intestine, but no enlargement or ulceration of Peyer's patches. From the spleen was obtained a pure culture of an organism which, though it at first sight appeared to be typhoid bacillus, the author considers to belong to the group of *Bacillus enteritidis*. The organism was motile, decolorized by Gram, and did not liquefy gelatin or coagulate milk; it fermented glucose. The blood-serum from some typhoid patients gave a clumping reaction with this organism at low dilutions only, while the serum of the patient had given a reaction with typhoid bacilli at 1:25, but not at 1:50.

An Encapsulated Diplococcus in Mastoiditis.—Mary S. Packard² (Rhode Island) describes an encapsulated diplococcus occurring in mastoiditis, and refers to several similar cases reported in the literature.

The Chancroid Bacillus.—Lincoln Davis³ (Boston) states that the

¹ Dublin Jour. Med. Sci., Sept., 1902.

² Jour. Med. Research, 1903, ix, 141.

³ Jour. Med. Research, 1903, ix, 401.

results of his investigations (8 cases) contribute in some measure to the accumulating evidence of the specific agency of a bacillus of Ducrey in the causation of chancroid and its associated buboes. He states that the organism is present in the purulent secretions of the great majority of cases of chancroid, and occasionally also in the pus of buboes, and may be identified by its morphology and staining reaction, together with its inability to grow on ordinary culture-media. Characteristic growth of the organism in a pure state may be obtained in suitable media from genital chancroids direct, and also in some cases from chancroidal buboes. Growth is more luxuriant in a medium of fresh blood and bouillon, but unmixed human blood is the best medium for obtaining cultures from a source open to contamination. Inoculation of a pure culture of the bacillus or of chancroidal pus upon the skin of a certain species of monkey reproduced the lesion, from which the original organism was recovered in culture. Davis believes that the cultivation of the same organism in a pure state from lesions on the hands, clinically resembling chancroid, in the absence of genital lesions, indicates that chancroid may be primary upon an extragenital site, and that bacteriologic examination of all ulcers of this type is likely to establish in the future a greater prevalence of extragenital chancroid than has hitherto been reported.

The Inoculation of Monkeys with the Cause of Soft Chancre.—E. Tomaszewski¹ has been able to grow the streptobacillus described by Ducrey in pure culture on blood-agar. With the cultures he has succeeded in producing in a crown monkey ulcers that were clinically and microscopically like those of soft chancre. In a Java monkey ulcers were also obtained, but they had a more abortive course. The author has also been able to produce typical soft ulcers on himself with the third generation of the bacillus.

The Experimental Inoculation of Syphilis.—Roux and Metchnikoff² inoculated a young female chimpanzee in the preputial fold of the clitoris with material taken from a syphilitic sore of about a month's duration. The same day the animal was inoculated about the right eyebrow with syphilitic virus from ulcerated mucous plaques of the penis which had developed in the neighborhood of a healed hard chancre. Five days later the chimpanzee was again inoculated in another part of the preputial fold of the clitoris with scrapings from an indurated syphilitic sore 3 days old. No immediate local effects resulted, but on the twenty-sixth day a small oval vesicle made its appearance at the site of the first inoculation. After a few days it became transformed into a depressed ulcer with induration of the surrounding tissues. An inguinal adenitis comparable to that in syphilis also developed. Secondary symptoms had not appeared although the animal had been under observation for 46 days. Professor Fournier, who had examined the chimpanzee, was of the opinion that the ulcer was syphilitic. [The character of the men concerned in this important experiment is sufficient guarantee of conscientiousness. Further reports must, however, be awaited before an expression of opinion is advisable.]

¹ Deut. med. Woch., June 25, 1903.

² Bull. de l'Acad. de Méd., July 28, 1903, p. 101.

Branching Forms of Certain Bacteria.—L. M. Loeb¹ (Chicago) reviews the literature of branching forms of bacteria and gives the results of some observations of his own, especially concerning tubercle bacilli and typhoid bacilli, of both of which he was able to secure branching forms. He believes that it is difficult to explain the mechanism of the formation of branches. He cites Fischer, who observed the rupture of the membrane of bacteria as a result of changes in the osmotic pressure of the media surrounding them, and the extrusion of portions of the protoplasm, "plasmoptysis" (spitting of the protoplasm). It is probable that, after the restoration of osmotic equilibrium, a new membrane is formed to include the extruded protoplasm. If complete plasmolysis has occurred, further development of the organism must cease; otherwise life continues. It is possible that growth of the protoplasm may be especially vigorous at the point where the cell-wall has been most weakened. If that is the case, the origin of branches is readily understood. Whether the causes of branching in tubercle bacilli are of the same nature cannot be said. Probably many other factors are concerned, such as the toxins and the products of the tubercle bacilli in the culture-media, or the glycerin and glucose, so frequently used in media, may play a part. At any rate, the occurrence of branching tubercle bacilli in old cultures, their loss of pathogenicity, and their slight power of multiplication, would suggest that such forms are the result of degenerative changes rather a reversion to a higher type of fungus.

The Pathology of Forage-poisoning, or the So-called Epizootic Cerebrospinal Meningitis of Horses.—D. J. McCarthy and Mazyck P. Ravenel² (Philadelphia), from a study of the subject, reach the conclusion that the so-called epidemic cerebrospinal meningitis of horses is not a true meningitis, and presents neither the gross nor the microscopic lesion of true meningitis. The evidence goes to show that all epidemics are caused by some poisonous substance contained in the forage. The lesions in the intervertebral ganglions so closely resemble those described by Van Gehuchten and Nelis in rabies as to offer the presumption that the pathologic process in the two diseases is somewhat similar. The differential diagnosis between forage-poisoning and rabies depends upon (a) the absence from the medulla and pons in forage-poisoning of the perivascular and pericellular lesions (rabid tubercles of Babes); (b) in forage-poisoning there is predominance of pericapsular rather than intracapsular round-cell infiltration of the ganglion cells; (c) lesions of the larynx and laryngeal nerves. The clinical history is always conclusive. Forage-poisoning is a much better and more comprehensive term than "cerebrospinal meningitis," or than "leukoencephalitis," as proposed by MacCallum and Buckley.

Ravenel and McCarthy have made further reports on their studies of the **microscopic lesions found in rabies**, and the **rapid diagnosis of the disease** by microscopic examination of the medulla, according to the method of Babes, and of the intervertebral ganglions and plexiform ganglion of the pneumogastric nerve, according to the method of Van

¹ Jour. Med. Research, 1902, viii, 415.

² Jour. Med. Research, x, 1903, 243.

Gehuchten and Nélis¹. Normally these ganglions are composed of a supporting tissue holding in its meshes the nerve-cells, each one of which is inclosed in an endothelial capsule. The changes characteristic of rabies consist in the atrophy, the invasion, and the destruction of the nerve-cells brought about by new-formed cells derived from the capsule, which appear between the cell-body and the capsule. These new-formed cells increase in number, invade the protoplasm of the nerve-cell, and finally completely occupy the entire capsule.² The authors report 105 cases in which the method was carried out. In 87 a prompt diagnosis was possible by examination alone, and in 94 by the examination of the ganglions or medulla.³ The chief cause of failure is the premature killing of the animal. When the disease runs its course, ending in death, they have never failed to find the lesions described. They have examined several cases of hydrophobia in man, and found lesions both in the medulla and ganglions. The changes in man are not so marked as in some of the lower animals. In one disease only have they found lesions liable to be mistaken for those of rabies, namely, "forage poisoning" of horses and cows.⁴ In this disease the medulla does not show the "rabic tubercle" of Babes, and the proliferation about the ganglion cells is pericapsular, rather than intracapsular. The differentiation is not usually difficult under the microscope, and is always made clear by the history.

Histologic Diagnosis of Rabies.—U. Biffi⁵ (Palermo) contributes the results of a large number of experiments with animals of divers species affected with rabies, both by artificial inoculation and by bites of rabid animals. The essential fact resulting from this work is that the most characteristic lesions for the diagnosis of rabies are represented by the multiplication of endothelial and connective-tissue nuclei in the connective tissue of the central nervous system, and particularly by the accumulation of these nuclei associated with migratory elements, about the neurons and the vessels, both in the ganglion of the vagus and of the bulb. By a special method of staining he was able to demonstrate the proliferation of the endothelium and the perivascular infiltration of nuclei of neuroglial origin. The virus of rabies requires only a few days to provoke lesions which, in other affections, are produced very slowly, requiring years.

The Early Pathologic Changes in the Nervous System produced by Rabies.—Anglade and Choireaux⁶ state, in a communication made to the Société de Biologie, the results of experiments made to determine the earliest lesions found microscopically in the nervous system as the result of rabies. They conclude (*contra* van Gehuchten) (a) that the

¹ The Rapid Diagnosis of Rabies. (A Preliminary Report.) Pathological Society of Philadelphia, June 14, 1900.

² The Rapid Diagnosis of Rabies. Pathological Society of Philadelphia, Jan. 10, 1901.

³ The Clinical Manifestations of Hydrophobia, Jour. Am. Med. Assoc., March 21, 1903.

⁴ A Pathology for Forage-poisoning, or the So-called Epizootic Cerebrospinal Meningitis in Horses. Jour. of Med. Research, vol. x, No. 2, October, 1903.

⁵ La Semaine Méd., May 21, 1902.

⁶ Prog. Méd., May 31, 1902; Brit. Med. Jour., Aug. 23, 1902.

lesions found in the nerve-cells are not specific and diagnostic as regards rabies, and are not early enough in appearance as compared with lesions of the neuroglia and bloodvessels; (b) changes in the glia and blood-vessels appear early and in an intense degree, and afford a valuable diagnostic feature; (c) the changes in the neuroglia and in the capillaries are contemporaneous, the endothelium proliferates and the perivascular network of neuroglia becomes infiltrated with "nuclei" intermingled with blood-corpuscles which have emigrated from the bloodvessels, the corpuscles being less abundant than the neuroglia nuclei above mentioned; (d) these nuclei which pervade the parenchyma of the nerve tissue surround the cell-bodies of the nerve-cells, and by their presence and the pressure they produce the nerve-cells are irritated; (e) the neuroglia cells of the ependyma also proliferate, giving rise to both fibrils and nuclei, which push the epithelium into elevations which project into the ventricular spaces. The neuroglia fibers and cells also appear to stretch among the groups of nerve-cells near the ependyma (as in the floor of the fourth ventricle); (f) many of these changes, say the authors, may be observed in epilepsy, general paralysis, and in some forms of tuberculosis of the nervous system. The virus of rabies, however, produces these changes in a few days, whereas the other diseases take years to bring about similar changes.

The Malarial Origin of Zoster.—According to J. M. Winfield,¹ the malarial plasmodium is the cause of herpes zoster in at least 40 % of the cases. Of 33 cases examined by him, 18 gave positive evidence of paludism. He does not consider it to be the only causative agent, but thinks that many different varieties of bacterial intoxication may bring about the same effect.

Bacteriology of the Fibrinous Exudate in Septic Peritonitis.—T. J. Manahan² (Boston) gives the result of his study of the bacteriology of the fibrinous exudate in 19 cases of acute peritonitis. In 17 of the cases bacteria were found in the fibrin. In 2 cases organisms were present in cover-glass and culture, but could not be identified in the fibrin. In 3 cases no lesion was found in the peritoneal cavity as a cause for the peritonitis. In 1 of these pneumococci were present in smear preparation, in culture, and in the fibrin. The duration of the infection in this case was 3 days. In 2 cases streptococci alone were found in the smear preparation, culture, and fibrin. The duration of the disease in one case was 11 days and in the other case 2 days. In 7 cases streptococci and colon bacilli were present in the smear preparations, culture, and fibrin. In some of these cases, however, one of the organisms occasionally failed to be isolated in culture, although it was present in the smear and in the fibrin. Two cases showed streptococci, colon bacilli, and *B. aerogenes capsulatus*. *Bacillus aerogenes capsulatus* was present in the smear preparation and in the fibrin in each case, but was not isolated in culture, although anaerobic cultures were made. One case showed streptococci and colon bacilli in the smear preparation, in the culture, and in the fibrin. A culture in this case was taken at the opera-

¹ N. Y. Med. Jour., Aug. 2, 1902.

² Jour. Med. Research, 1903, ix, 445.

tion 5 days before death, and showed streptococci and *B. mucosus capsulatus*. One case showed colon bacilli in smear preparation, in the culture, and in the fibrin. Another case showed in the smear preparation and in the fibrin *B. mucosus capsulatus*, colon bacilli, and *B. aerogenes capsulatus*. Culture in this case showed colon bacilli and *B. mucosus capsulatus*. The colon bacilli and *B. aerogenes capsulatus* in another case were present in smear preparation and in the fibrin. Culture showed the colon bacilli only. One more case showed the colon bacilli and *B. mucosus capsulatus* in the smear preparation and culture, while the colon bacillus alone was present in the fibrin. It is to be concluded from the observations in these 19 cases that in most cases of acute peritonitis with fibrinous exudation bacteria are present in large numbers in the fibrin.

Experimental Researches on Pathogenic Yeasts.—K. Sternberg¹ (Vienna) publishes extensive researches concerning the character and pathogenic effects of 15 different strains of yeasts, 6 belonging to the class of oidia, the rest belonging to the true yeasts or blastomycetes; 3 of the oidia and 4 of the blastomycetes were pathogenic for animals. The following are Sternberg's conclusions: Oidia and yeasts may be pathogenic for the greatest variety of animals, but for man they seem to have but slight pathogenic importance. The pathogenic oidia produce an acute morbid process in rabbits with multiple inflammatory nodules in kidneys, spleen, and other organs. Of more importance are the changes produced by the yeasts; 3 of those were the yeasts described by Sanfelice, the fourth that isolated by Busse and named by him "*Saccharomyces hominis*." They produced on the one hand an acute inflammatory process with the formation of numerous cellular infiltration nodules in different organs; on the other hand they proved capable of originating a characteristic granulation-tissue showing little tendency to regressive changes, which from its richness in epithelioid cells has somewhat the appearance of true newgrowth. Careful histologic examination shows that through massing of the fungi in the organs of the animal body pseudotumors (inflammatory structures) may be formed, but never true tumors, as claimed by some authors. Yeasts cannot be distinguished histologically in the tissues with much certainty. The cell inclosures described in carcinoma have been shown not to belong to the yeasts. The cultivation of yeasts under aseptic conditions from new-growths has never been satisfactorily demonstrated. Experimental inoculations of yeasts give no support to the theory that they are the cause of malignant growths.

Formation of Toxoids in Tetanus Cultures.—A. Bonome² (Padua) has discovered that the soluble products of *Bacterium coli*—that is, the colon toxins—retarded the development of the tetanus bacillus when mixed with the culture-medium for the bacillus in the proportion of one-fourth of the former's volume; and further, that the quantity and activity of tetanus toxin developed in such a medium were lessened. This diminution was not due to attenuation of the bacilli, as proved by the toxic effect, when inoculated into animals some time after having

¹ Ziegler's Beitr., 1902, xxxii, 1.

² Riforma medica, Aug. 30, 1902.

been subjected to the influence of such a culture-medium, but rather to a modification of the tetanus toxin by the nutrient medium which destroyed the toxic element in great part. That part of the toxin which excites "immunizing reaction" in living protoplasm was unchanged, however, by the influence of the colon toxin; injections into guinea-pigs of filtrates of the cultures which had been subjected to its action failed to induce tetanic symptoms, and produced a certain degree of immunity to injections with virulent tetanus cultures. This immunity is probably due to the development of tetanus toxoids in the presence of *Bacterium coli*, the toxoid possessing the power to excite formation of tetanus antitoxin in the body of the living animal.

The Blood in Filariasis.—W. J. Calvert¹ (St. Louis) has made special studies of the leukocytes in filariasis, reporting 2 cases. His tables show hourly counts and differential counts. During the early stages of filariasis leukocytosis and eosinophilia are present. Both are periodic and related to the periodicity of the embryos in the peripheral circulation, following their appearance by a few hours. The embryos possess a chemotactic property especially for the eosinophiles, attracting large numbers of them (as many as 22.4 %) from the peripheral circulation. As the disease progresses this chemotaxis disappears, and the leukocytes and eosinophiles gradually decrease to normal.

Strongyloides Stercoralis, the Correct Name of the Parasite of Cochin China Diarrhea.—Ch. W. Stiles and A. Hassell² (Washington) give two reasons why *Strongyloides intestinalis* cannot bear the term "intestinalis": (1) It was named "*Anguillula stercoralis*" by Bavay in 1876, the earliest description. (2) When Bavay spoke of it a year later as "*Anguillula intestinalis*," he overlooked the fact that this name was preoccupied. Ehrenberg, in 1838, had already given the name "*Anguilla intestinalis*" to a parasite which von Gleichen (1776) found in the earthworm. As it has since been placed with the genus *Strongyloides*, its corrected name is "*Strongyloides stercoralis*."

Uncinariasis (Ankylostomiasis) the Most Common of the Serious Diseases of the Southern Part of the United States.—H. F. Harris³ (Atlanta) reports several cases of ankylostomiasis which upon closer study were found to be the variety described by Stiles as *Uncinaria americana*. Harris has examined large numbers of specimens of feces, especially from anemic people, in whom the anemia was thought to be due to malarial poison. In almost every instance he found, instead of malarial organisms, the eggs of ankylostoma in the feces. Taking this as a basis, he concludes that most of the anemias of the Southern States are brought on by ankylostoma.

Parasitic Hematuria.—L. N. Boston⁴ (Philadelphia) reports 2 cases of hematuria having a parasitic origin. The first patient's urine contained many parasites, but no conclusion concerning their species or genus could be made; they were thought to be *Trichocephalus dispar*. The second patient had an echinococcus cyst of the kidney. Its products were eliminated with the urine.

¹ Jour. Am. Med. Assoc., Dec. 13, 1902.
² Amer. Med., Nov. 15, 1903.

³ Amer. Med., Aug. 30, 1902.
⁴ Amer. Med., Jan. 3, 1903.

INTOXICATIONS, IMMUNITY, HEMOLYSIS, ETC.

Studies in Hemolysis.—H. Landau¹ has made a study of the effects of hemolysis upon the corpuscles of cold-blooded animals. He injected rabbits with the blood of frogs and of tortoises, and subsequently tested the effect of the serum of the rabbits thus injected upon the corpuscles of the two species furnishing the blood for the primary injection. He found that the protoplasm of the red corpuscles was promptly dissolved, while the nucleus resisted the hemolytic action. The hemolytic serum was not entirely specific, but the serum active for the blood-corpuscles of frogs also dissolved the erythrocytes of the goat, the triton, the salamander, and the axolotl; while the serum specific for the red cells of the land tortoise acted also upon the blood of the water tortoise. This non-specificity was also noticeable in the precipitating power of the serums, and proved that there is a biologic relationship among the albumins coming from different related species.

The Plurality of Cytolysins in Normal Blood-serums.—Simon Flexner and Hideyo Noguchi² (Philadelphia) undertook a study to determine the existence in normal blood-serums of cytolsins for cells other than red and white corpuscles. Serums from warm-blooded and cold-blooded animals,—dog and rattlesnake,—as well as from *necturus*, were chosen for the experiments, and the results demonstrated the occurrence in them of solvents for a wide variety of animal cells. The specificity of the solvents for the different cells was then investigated, and it was proved that the removal of a part of the solvents by means of certain cells does not prevent action of the treated serum upon still other cells. This shows that the solvents are in part at least especially adapted to given cells; while a general reduction in activity of the serums which have lost a part of their solvents suggests that these are not absolutely specific. The mechanism of the solvent action is probably identical with that of serum-hemolysis and depends upon the interaction of amboceptors and complements. That the amboceptors are multiple in each serum would seem to be proved by the absorption tests; but whether the complements are also multiple has not yet been determined but it is highly probable that they are. Moreover, the inability of the serum amboceptors to unite with alien complements in the emulsions of organs would indicate that they are isocomplementophilic.

A Study of Immunization Hemolysins, Agglutinins, Precipitins, and Coagulins in Cold-blooded Animals.—H. Noguchi³ (Philadelphia) has determined by numerous experiments that artificial hemolysins, agglutinins, antiagglutinins, serum precipitins, aqueous humor precipitins, and milk coagulins can be produced through immunization in certain cold-blooded animals. The hemolysins and agglutinins for erythrocytes can be produced in animals which do not possess erythrocytes. Isoagglutinins and isoantihemolysins can be produced in certain species of

¹ Ann. de l'Inst. Pasteur, xvii, No. 1, 1903.

² Jour. Med. Research, 1903, ix, 257; Univ. of Pa. Med. Bull., 1903, xvi, 158.

³ Univ. of Pa. Med. Bull., 1902, xv, 301.

turtles. The isobodies thus developed have a slight erythrocytolytic action upon the blood of other though related species of turtles. The complement of turtle's blood is rendered inactive by a temperature of 50° maintained for 30 minutes. The precipitins and coagulins for aqueous humor and milk can be produced in animals which do not possess the corresponding fluids in the same sense.

A Hemolytic Complement Found in the Blood of Rabbits.—J. E. Sweet¹ (Philadelphia) has produced a hemolytic complement for bovine erythrocytes in the serum of rabbits by intraperitoneal injections of defibrinated bovine blood. This hemolytic complement may be increased by injection of substances having a positive chemotactic action upon the leukocytic complex (*Staphylococcus pyogenes aureus*, sterile oil of turpentine, and sterile suspension of aleuronat). The complement is not derived from the leukocytes, but is present in the serous portion of an exudate. It is not present in the normal aqueous humor, but is contained in the aqueous humor of inflammatory origin. It must therefore be present in a free state in the circulating blood-plasma, and this must be considered a further argument against the theory of leukocytic origin of the hemolytic complements, as there are no leukocytes present in this newly formed liquid. After a short lapse of time the complement disappears from the fluid of the anterior chamber, due to the return of normal conditions. Direct experiments with artificial serum prove that this hemolytic complement is present in a free state in the circulating blood-plasma, and furnish additional evidence that this hemolytic complement is not contained in the leukocyte and set free by the process of coagulation.

The Bacteriolytic Serum-complements in Disease: A Contribution to our Knowledge of Terminal and Other Infections.—W. T. LongCOPE² (Philadelphia) concludes from his studies concerning the bacteriolytic serum-complements in disease that normal individuals show slight fluctuations in bacteriolytic complement-content of their blood. In many prolonged chronic affections, such as nephritis, cirrhosis of the liver, and diabetes mellitus, there is a marked decrease in the bacteriolytic blood complement, which becomes more marked toward the end of the disease. Terminal infection in chronic disease is probably the direct result of the diminished quantity of the bacteriolytic complement. The blood-serum of certain individuals suffering from chronic disease does not show a reduction in complement; these individuals appear to escape terminal infection. Hyperleukocytosis is frequently associated with high complement-content of the blood-serum for typhoid and colon bacilli. The blood-serum of some typhoid fever patients shows a diminution in the specific complements for the typhoid bacillus. Human blood-serum contains a multiplicity of bacteriolytic complements.

The Interaction of the Blood of Cold-blooded Animals with Reference to Hemolysis, Agglutination, and Precipitation.—H.

¹ Univ. of Pa. Med. Bull., 1902, xv, 374.

² Univ. of Pa. Med. Bull., 1902, xv, 344.

Noguchi¹ (Philadelphia) has found that the serums of many cold-blooded animals contain agglutinins, hemolysins, and precipitins; that the amount of each present in any given serum is no measure of the amount of the other principles; that in some species of animals agglutinins for certain kinds of corpuscles are present, but no hemolysins; but the presence of active hemolysins is likely to be attended with the existence of marked agglutinating property for some species of corpuscles; that agglutinins and hemolysins occurring in serums are probably multiple in kind; that agglutinins are active upon red and white corpuscles irrespective of whether the animal yielding them possesses both red and white or only white corpuscles. The hemolysins are erythrocytolytic and leukocytolytic if obtained from animals possessing red and white corpuscles; in animals possessing only white corpuscles hemolysins are wholly or almost wholly absent. The serum of certain warm-blooded animals exhibits agglutinating power over red corpuscles of some species of cold-blooded animals, and causes slight precipitation with a few kinds at least of serums of these animals.

The Influence of Alcoholic Intoxication upon Hemolysis.—A. C. Abbott and D. H. Bergey² (Philadelphia) have performed experiments to determine the influence of alcohol administered per os upon the complement content of the blood of rabbits; upon the specific blood reactions of rabbits already artificially immunized against an alien blood; the influence of alcoholization upon the process of artificial immunization by an alien blood. Their results are embodied in the following conclusions: (1) The daily administration of alcohol per os to rabbits brings about a reduction in their circulating blood of the hemolytic complement. (2) Slight alterations in the normal alkalinity of the blood-serum have no demonstrable influence upon the hemolytic complement of the blood of alcoholized rabbits. (3) The diminished reactivating power of the blood of alcoholized rabbits is not due to the presence of small amounts of alcohol as such in the blood. (4) The administration of alcohol to rabbits induces not only a marked reduction in the complement content of their blood, but may cause, at the same time, a reduction in the specific hemolytic receptor of the blood of rabbits artificially immunized against an alien blood. (5) The diminished complement content of the blood of alcoholized rabbits renders the animals more susceptible to the toxic action by an alien blood.

The Pathology of Lymphotoxic and Myelotoxic Intoxication.—Simon Flexner³ (Philadelphia) gives the results of a series of investigations undertaken with a view to studying the histologic changes in the lymph-glands, spleen, and bone-marrow following the experimental injection of cytotoxic serums derived by immunization against these tissues, as well as the associated changes in the circulating blood. It was thought that the employment of cytotoxins in this manner might assist in determining the interrelationship of the several types of tissue concerned in the dis-

¹ Univ. of Pa. Med. Bull., 1902, xv, 295.

² Univ. of Pa. Med. Bull., 1902, xv, 186.

³ Univ. of Pa. Med. Bull., 1902, xv, 378.

pute as to the presence in the bone-marrow of lymphoid tissue or of a common ancestral cell from which both lymphocytes and granulocytes might be developed. Flexner states that while all the lymphatic tissues respond to the lymphotoxin and myelotoxin, yet the character of the response of the bone-marrow appears to be different—at least, in degree. While, therefore, the reaction of the lymph-gland, intestinal lymphoid tissue, and spleen to bone-marrow toxin is remarkable, the response of the marrow to lymphotoxins and splenotoxins is far less marked. There would, therefore, seem to be a peculiar potency in the myelotoxin which can only be explained by its possession of numerous amboceptors common to lymphoid cells, and hence capable of stimulating that tissue, wherever it exists, to activity. On the other hand, the smaller response of the bone-marrow to the foreign cytotoxins must depend upon its possession of a smaller number of cells with the corresponding receptors for fixation of the amboceptors of these serums. That the bone-marrow contains any such receptors is of interest at the present time on account of the doubt which still exists regarding the lymphoid structure of marrow.

The Effects of Lymphotoxins and Myelotoxins on the Leukocytes of the Blood and on the Blood-forming Organs.—C. H. Bunting¹ (Philadelphia), as a direct continuation of the just-mentioned work of Flexner and under his direction, reaches the conclusion that leukocytosis is the excessive reaction of the leukoblastic tissues to a leukopenia of the circulating blood. This leukopenia may be due to the withdrawal of leukocytes from the circulation or to their destruction within the circulation. The amphophilic, eosinophilic, and basophilic leukocytes are derived from the marrow. The lymphoid cells are chiefly derived from the lymph-glands and spleen. The marrow, however, is a lymphoid tissue and contains typical lymphocytes. The lymphocyte is ameboid. Amphophilic and eosinophilic myelocytes may multiply by mitosis. Their number may also be increased by the development of specific granules in the protoplasm of the large mononuclear elements with scant basophilic protoplasm, the least differentiated cell of the marrow and identical in appearance with the cells of the germinal centers of the lymph-glands. Basophilic cells are formed by the development of basophilic granules in mononuclear cells. Multiplication by mitosis is not excluded by negative findings. Megaloblasts are a constituent of normal marrow and form the proliferating center of erythroblastic tissue. [Not the least interesting result of these investigations of Flexner and Bunting is that which indicates that the lymphocytes and myelocytes (or granulocytes) are not such totally diverse structures histogenetically as has hitherto been generally maintained.]

The Germicidal Action of Alcohol.—C. Harrington and H. Harris² (Boston) have studied the disinfectant properties of alcohol with the following results: (1) Against dry bacteria, absolute alcohol and ordinary commercial alcohol are wholly devoid of bactericidal power, even

¹ Univ. of Pa. Med. Bull., 1903, xvi, 200.

² Boston M. and S. Jour., March 21, 1903.

with 24 hours' direct contact; and other preparations of alcohol containing more than 70 %, by volume, are weak in this regard, according to their content of alcohol; the stronger in alcohol, the weaker in action. (2) Against the commoner, nonsporing, pathogenic bacteria in a moist condition, any strength of alcohol above 40 %, by volume, is effective within 5 minutes, and certain preparations within 1 minute. (3) Alcohol of less than 40 % strength is too slow in action or too uncertain in results against pathogenic bacteria, whether moist or dry. (4) The most effective dilutions of alcohol against the strongly resisting nonsporing bacteria, such as the pus organisms, in the dry state, are those containing from 60 % to 70 %; such strengths are equally efficient against the same organisms in the moist condition. (5) Unless the bacterial envelope contains a certain amount of moisture, it is impervious to strong alcohol; but dried bacteria, when brought into contact with dilute alcohol containing from 30 % to 60 % of water, by volume, will absorb the necessary amount of water therefrom very quickly, and then the alcohol itself can reach the cell-protoplasm and destroy it. (6) The stronger preparations of alcohol possess no advantage over 60 % to 70 % preparations, even when the bacteria are moist; therefore, and since they are inert against dry bacteria, they should not be employed at all as a means of securing an aseptic condition of the skin.

Hemolysis in Experimental Infection.—O. V. Wurscheim¹ infected 22 rabbits and 2 guineapigs with anthrax bacilli, injecting them intraperitoneally and subcutaneously. The autopsy was performed immediately after death and in every case thus observed a discoloration of the blood-serum, a hemoglobinemia, was found. Up to 1½ hours before death this hemoglobinemia did not exist. This hemolysis is probably due to what Wurscheim calls anthracolysin, which is found in the animal organism. Hemoglobinuria was never seen; probably on account of the speedy death of the animals. Too many red blood-cells are destroyed and the hemoglobinemia is too sudden to allow the hemoglobinuria time to appear.

Multiplicity of the Serum Hemagglutinins of Cold-blooded Animals.—H. Noguchi² (Philadelphia) details the results of experimental studies which led him to the conclusion that the serum of *Limulus polyphemus* contains several, and perhaps many, agglutinins which are, in part at least, specific for certain erythrocytes. The agglutinins show varying degrees of heat lability, although temperatures of 40° C., when continued for 30 minutes, diminish the activity of all of them. Temperatures approaching 65° C. seem to destroy wholly the agglutinating power of the serum for erythrocytes. The complete absorption of agglutinins for the corpuscles of one or several species of animals from *Limulus* serum leaves the remainder of the agglutinins in almost undiminished quantities. A slight difference, in the case of certain erythrocytes, has been noted in the rapidity with which the reaction is completed in the serum from which a part of the agglutinins has been removed. The serum of *Mustelus canis*, so far as its agglutinins are

¹ Münch. med. Woch., June 30, 1903.

² Jour. Med. Research, 1902, ix, 168.

concerned, agrees in its action probably with that of *Limulus*. *Limulus* and *Mustelus* serums contain a multiplicity of agglutinins for erythrocytes of cold-blooded animals.

The Nonidentity of Agglutinins Acting upon the Flagellums and upon the Bodies of Bacteria.—T. S. Smith and A. L. Reagh¹ (Boston), from a study of the subject, reach the conclusions that the nonmotile race and the motile races of the hog-cholera bacillus and *B. icteroides* (*Sanarelli*) manifest a close affinity toward one another in the presence of immune agglutinins. This affinity enables one to differentiate the agglutinins of motile bacilli into flagellar and body agglutinins. The agglutinin acting upon the bodies of the nonmotile hog-cholera bacillus is identical with that acting upon the bodies of the motile race or species, but different from that acting upon the flagellums. The flagellar agglutinins are much more easily demonstrated in immune serums. In the cultures studied, the presence of the former was manifested in dilutions over twenty times greater than in those in which body agglutinins became demonstrable. In order to obtain body agglutinins, a much higher degree of immunity must be induced. It is believed that the assumption of two agglutinins, as thus defined, will probably serve to clear up various apparent discrepancies in agglutination tests and explain the so-called thread reaction.

Proteolytic Enzymes.—A. C. Abbott and N. Gildersleeve² (Philadelphia), from a study of the proteolytic enzymes and of the so-called hemolysins of some of the common saprophytic bacteria, state that the destiny in the body of nontoxic, though otherwise physiologically characteristic, products of bacterial life is determined by the presence of specific neutralizing substances that can be demonstrated in the circulating blood. By the customary methods of artificial immunization the amount of such antidotal substances in the blood may be increased, but only to a slight degree. Through the use of serums from animals immunized from the nontoxic bacterial products, poor though such serums are in specific immune body, it is possible to distinguish the proteolytic enzymes resulting from the growth of different bacterial species from one another, as well as from certain physiologically analogous enzymes of animal origin. The proteolytic enzymes elaborated by certain bacteria in the course of their growth are much more resistant to high temperatures than is generally supposed; some being capable of exhibiting their characteristic function after exposure in the moist state to a temperature of 100° C. for from 15 to 30 minutes. The so-called hemolysins of bacterial origin are probably, at least in some cases, proteolytic enzymes, and it is possible by experimental means to contribute material support to the doctrine of Welch concerning the origin of "bacteriogenic cytoxins."

Change of the Hemolytic Power of Blood-serum.—Glinchikoff³ examined into the strength of the hemolytic power of dogs' blood-serum against rabbits' erythrocytes. He found that the process of digestion

¹ Jour. Med. Research, 1903, x, 89.

² Jour. Med. Research, 1903, x, 42.

³ Bolnit. Gaz. Bot., Nos. 30 and 31, 1902.

increased this power, the increase reaching its maximum 7 hours after the meal. He also found that, of the different foods, fat increased the hemolytic power most, meat least, and bread and milk occupied in regard to this power a position between fat and meat.

The Bactericidal Effect of Human Blood on Certain Species of Pathogenic Microorganisms and the Bactericidal Effect Obtained by the Addition to the Blood *in Vitro* of Dead Cultures of the Micro-organisms in Question.—A. E. Wright and F. N. Windsor,¹ from experiments, conclude that: (1) Human serum has a powerful bactericidal effect upon the typhoid bacillus and the cholera vibrio, but is without bactericidal action upon *Streptococcus pyogenes*, *Bacillus pestis*, *Micrococcus melitensis*, *Staphylococcus pyogenes*, and *Bacillus diphtheriae*. (2) Sterilized cultures of those species of pathogenic microorganisms which are killed by the serum appear, in contradistinction to those species of microorganisms which are not affected by the serum, to possess the power of directly abstracting a bactericidal element from the blood.

Diphtheria and Tetanus Toxin, and Hemoglobin.—Kukharshevsky² injected diphtheria toxin subcutaneously into a rabbit; the number of the erythrocytes diminished, the number of the white corpuscles increased, the specific gravity increased, and the quantity of hemoglobin diminished. When injecting tetanus toxin the result is the same, with the exception of the specific gravity, which after the injection of tetanus toxin diminishes.

The New Antiserum Method of Differentiating Human from Other Blood.—A. J. Patek and W. C. Bennett³ (Milwaukee) have modified Uhlenhuth's antiserum method in such a manner as to be able to differentiate human from other blood. They employed the following method for medicolegal purposes. They injected human blood-serum into the peritoneal cavity of rabbits in doses of 10 cc. every 8 or 10 days. After 6 injections the blood of the animals is collected and preserved on ice; the serum is pipetted off after 24 hours. Some rabbits, as control animals, are not injected. The blood to be tested, if dried, is first dissolved, and then, diluted with ordinary water and salt solution. Several drops of the test serum are added and the tubes placed at a temperature of 35°. If the blood to be tested is human, a turbidity appears invariably; if not human, it remains clear.

The Adrenal Gland and Its Active Principle in their Relations to Cytolysins and Antitoxin-production.—A. C. Abbott⁴ (Philadelphia) thinks it is doubtful whether the repeated injection of guineapig adrenals into rabbits results in the elaboration of a serum having demonstrable specific affinities for the adrenal glands of the guineapig *in situ*. The most conspicuous characteristic of a serum obtained by the injections is its destructive action upon the blood of the guineapig. This is believed to be referable to the small quantity of blood injected with the adrenal cells during the immunization of the rabbit. If the hemolytic

¹ Jour. of Hyg., 1902, ii, 385.

³ Amer. Med., Sept. 6, 1902.

² Russky Vratch, No. 29, 1902.

⁴ Jour. Med. Research, 1903, ix, 329.

receptors are removed from such an "adrenal serum" its toxic action upon the guineapig disappears. Rabbits exhibit more or less tolerance to gradually ascending intraperitoneal doses of the active principle of the adrenal gland. This tolerance is probably not accompanied by the presence, in the serum of the rabbits, of substances antagonistic (antitoxic) to the adrenal active principle *in vitro*.

Agglutination and Pathogenicity of Bacillus Subtilis.—S. S. Kneass and J. Sailer¹ (Philadelphia) have found that under certain conditions and circumstances *Bacillus subtilis* may become pathogenic, causing death in the lower animals and destructive inflammation in human beings. It gives a typical reaction of agglutination with the blood-serum of animals into which it has been injected, and owing to its size and motility would probably be an excellent subject for the demonstration of this reaction.

Serum Reaction of Bacillus Pestis in Plague.—R. Row² (India) has studied the serum reaction of *Bacillus pestis* in plague, and from his experiments draws the following conclusions: (1) Serum of plague convalescents is remarkable for its bactericidal properties toward *Bacillus pestis*. This property may be observed in convalescence of over 6 weeks and has been maintained in patients who had plague 12 and 18 months ago. (2) The serum of patients in the very early stages of the disease is certainly inhibitory to the growth of *Bacillus pestis*. The bacilli are few and far between, found only on close search, and involution forms are constantly found. (3) Blood-serum from normal individuals gives very good growth; some individuals give a scantier growth than others, but not one instance was found in which the blood completely destroyed the growth.

The Influence of Removal of the Liver on the Freezing-point of the Blood.—L. Pflughoef³ determined the freezing-point of the blood of geese, and then, to determine the influence of the liver upon it, he ligated and cut away its bloodvessels, thus removing it and its influence from the general circulation. The animals died within from 9 to 12 hours in violent general convulsions. The freezing-point was found to have changed but little. The experiments do not explain the grave symptoms which the animals presented, and with which they finally died, as the removal of the liver produced but slight changes in the molecular concentration of the blood.

The Reactions of the Blood in Experimental Diabetes Mellitus.—J. E. Sweet⁴ (Philadelphia) believes that his work justifies the following conclusions: (1) The subcutaneous injection of an alcoholic solution of phloridzin, which causes a transitory glycosuria, is followed by a slight, though readily demonstrable, increase in the serum of the rabbit of the hemolytic complement for bovine erythrocytes; this increase is to be explained as occurring coincidently with the inflammatory reaction of the organism to the injection. (2) No effect of injections of phloridzin upon the amoebocytector for bovine erythrocytes can be demonstrated.

¹ Univ. of Pa. Med. Bull., 1903, xvi, 131. ² Brit. Med. Jour., Dec. 20, 1902.

³ Deut. med. Woch., 1903, xxix, 351. ⁴ Jour. Med. Research, 1903, x, 255

(3) The intraperitoneal injection of adrenalin chlorid is followed by no marked effect upon the blood reactions; the injection may, however, cause an inflammatory reaction, and so cause an increase of complementary activity. (4) The complete removal of the pancreas from dogs, which causes a true diabetes mellitus of severe type, is followed by a marked decrease of the hemolytic activity of the diabetic dog's serum for both rabbits' and guineapigs' erythrocytes. (5) The diabetes caused by the complete extirpation of the pancreas is further characterized by what is to be interpreted by a complete loss of the normal bactericidal property of the serum of the dog. This can be demonstrated conclusively for *B. coli communis*, *B. typhi abdominalis*, and for *B. dysenteriae* (Shiga). Less conclusive is the demonstration of a decrease of bactericidal power of the diabetic serum for *Staphylococcus pyogenes aureus*, for the reason that the normal serum of the dog has very little, if any, bactericidal effect upon this organism. (6) This decrease of hemolytic activity of the serum of the diabetic dog is due to loss of hemolytic complements. The loss of bactericidal power is, from analogy with the hemolytic phenomenon, doubtless to be interpreted as due to a loss of bacteriolytic complements. (7) The complete removal of the pancreas is as necessary to this loss of complements as it is to the production of a diabetes. (8) The complete removal of the pancreas has not deprived the organism of its power to react to the inflammatory process by an increase of the complementary substances. (9) No disturbance of the normal relation of the receptors of the erythrocytes to specific hemolytic amoebocytes can be demonstrated in the course of a true experimental diabetes. (10) The loss of the complementary substances in diabetes mellitus points conclusively to the fact that no relation exists between the leukocytes of any type and the production of the complements. A decrease in the amount of glucose excreted by the diabetic organism cannot be shown to occur in the course of a secondary infection, at least during the earlier stages of the diabetes.

Gastrotoxin.—A. Theohari and A. Babes¹ have succeeded in producing a gastric cytotoxin in the following way: They injected goats with an emulsion of the mucous membrane taken from the peptic region of the dog's stomach. A varying number of injections were made. The serum of goats treated in this manner was used in the succeeding experiment. When a weak serum was injected into dogs, it produced a marked gastric hypersecretion. A strong serum injected into the veins caused the prompt death of the animal, with marked hyperemia of the mucosa of the stomach and of the small intestine. In smaller doses this same serum increased peristalsis and caused marked intestinal hemorrhages. The chief cells of the stomach showed functional changes, while in the parietal cells degenerative lesions were found. Curiously enough, the pyloric region of the stomach and the large intestine showed no change, while the small intestine presented striking alterations. It should be added that normal goats' serum has no harmful effects upon dogs.

¹ Centralbl. f. allg. Path. u. path. Anat., Bd. xiv, No. 11, June 18, 1903.

TUMORS.

Bone Tumors with Thyroidal Structure.—E. Gierke¹ (Heidelberg) reports the case of a man who after death was found to have a tumor near the fifth rib and running parallel with the vertebral column. The mass had permeated the muscles of the back and on section was found to be of colloid thyroidal structure. It had entered the vertebral canal on a level with the fifth dorsal spine. The dura was compressed at this point, the spinal cord small and soft. The fifth and sixth vertebrae, their ribs and intercostal spaces, were destroyed by the tumor. The thyroid gland was apparently normal. Microscopically a small adenomatous nodule was found; nothing was seen to point to the spinal tumor as a growth secondary to a thyroidal growth. A metastasis opposite the first lumbar spine showed the same structure. A further proof of the tumor being comprised of thyroid tissue was found in the presence of iodin. Evidently thyroid cells had been swept along the blood-stream, and after their deposition in the bone had acquired the ability of developing as a malignant structure. [The report is interesting in its bearing upon the parasitic theory of tumors, a theory that certainly fails to explain such cases.]

The Histologic Structure of Chondromas.—R. Spuler² (Heidelberg) has examined hyaline and elastic chondromas to determine if the histologic picture of pathologic cartilage differs from that of normal cartilage. He found that in the ground-substance of all chondromas fibrillas are to be found, and not only in the degenerated areas, where it has long been known to exist, but also in the tissue with typical structure of cartilage. In embryonal chondromas the fibrillas are finer and shorter, probably due to the scanty secretion of chondromucoid cement, ground-substance, and the lack of differentiation of individual cells. In elastic chondromas the picture is the same as in normal elastic cartilage. The different stages of elastic cartilage can be traced throughout the tumor.

Osteochondrosarcoma of the Thyroid.—O. Funkenstein³ (Bern) reports 2 cases, in which goitrous thyroids showed sarcomatous masses made up of spindle-cells. The intercellular substance was made up of fibrillary and hyaline material and contained in addition cartilage and bone. One patient presented similar metastases in the lungs and a purely sarcomatous metastasis in one adrenal gland. The tumors belonged to the class of osteochondrosarcoma.

Mixed Tumors of the Thyroid Gland.—L. Loeb⁴ (Buffalo) summarizes his article as follows: In the thyroid gland there have been found in man and in different species of animals mixed tumors of the type of carcinosarcoma. All the tumors described so far have certain characteristic points in common. Although carcinosarcomata have been found in other places, the majority occur in the thyroid. There also are found in the thyroid gland combinations of new-formed bone and sarcoma. The facts which have been cited in favor of the embryonic origin of mixed tumors cannot be applied in the case of these mixed tumors.

¹ Virchow's Archiv, 1902, clxx, 464.

² Ziegler's Beitr., 1902, xxii, 253.

³ Virchow's Archiv, 1903, clxxi, 34.

⁴ Am. Jour. Med. Sci., 1903, cxxv, 243.

The fact that the tumor is a mixed tumor is in itself not sufficient to prove its embryonic origin. It is not possible to determine with certainty, from the character of the constituent parts of a mixed tumor, from what kind of embryonic cells such a tumor is derived. Heterotopic tumor-formation need not necessarily be produced by displaced blastomeres.

Primary Adenocarcinoma and Perithelial Hemangiosarcoma (Sarcocarcinoma) of the Thyroid.—P. G. Woolley¹ (Montreal) reports a tumor of the thyroid about the size of two closed fists, that had a distinct capsule, was partially cystic and hemorrhagic, and the left lobe of which contained what appeared to be a bone. Only a small part of the mass showed well-staining tissue within the capsule. The hemorrhage had been so great and the tension such that much of the parenchyma had undergone degeneration. The parenchyma was composed almost entirely of typical adenoma with large and small alveoli with and without colloid. The area supposed to have been bone proved to be simply a hyaline tissue with calcareous infiltration. The recurrent growths resembled the ordinary adenomas of the thyroid. The cell collections were either large or small, and formed alveoli lined with a single layer of epithelial cells and with the central mass of colloid material. The cell groups were packed closely together with but little intervening fibrous tissue. The mass of the specimen was made up of a more or less whorled tissue composed of well-stained cells of the character of young connective tissue. In this there were many spaces filled with red blood-corpuscles. The whorls of spindle-cells were arranged about the blood-spaces, and these spaces were provided with an intact endothelial lining. The picture was that of a perithelial angiosarcoma, composed of short spindle-cells. Many of the bloodvessels were filled with colloid. Besides this mass of sarcomatous tissue there were also some small areas that had the general appearance of carcinoma.

A Case of Double Carcinoma of the Gall-bladder; a Contribution to the Metaplasia Question.—J. G. Mönckeberg² (Hamburg) reports a case in which the gall-bladder was the seat of two malignant tumors, an adenocarcinoma and an epithelioma. Both were absolutely typical. At the point of union they both continued to grow so that in the midst of a series of tubules an epitheliomatous pearl could be seen, and vice versa. In a few places forms were seen which were typical of neither the one nor the other; they were probably pseudometaplastic. The liver contained metastases of both tumors, but especially of the epithelioma. They coexisted side by side, but were not seen growing into each other. The author thinks that the epithelioma grew from an island of squamous epithelium in the mucous membrane of the gall-bladder, which probably originated through metaplasia. He does not believe that the adenocarcinoma changed to an epithelioma.

Formation and Growth of Lymphangiomas.—C. Sick³ (Berlin) reports the case of a man of 21 who had always had an enlarged ab-

¹ Amer. Med., Aug. 30, 1902.

² Virchow's Archiv, clixix, 1902, 359.

³ Virchow's Archiv, 1902, clxx, 9.

domen and who presented in the left side a mass, which seemed to be either a hydronephrosis or a cystic tumor. Operation revealed a large number of retroperitoneal cysts, which the autopsy 3½ months later showed to be of various sizes up to the size of a child's head, and which extended from pelvis to diaphragm. The mass was made up of lymph-vessels and connective tissue and was considered to be a congenital cavernous lymphangioma with cyst-formation. The lymphatic spaces were of various sizes and many of them were obliterated by lymph-thrombi. The connective tissue was actively proliferating, and in it new lymph-vessels were forming, some of which had attained large size. The formation of the tumor is explained on the basis of the existence during embryonal life of an independent lymph-vessel connective-tissue layer which had grown progressively. True lymph-follicles were found in the walls of the lymph-vessels, thus increasing the similarity of this tissue to fetal lymphadenomatous tissue. The second patient, a woman of 65, had large cysts of the ovary and gastrohepatic omentum. The former showed carcinomatous degeneration; the latter were probably lymphangiomatous.

The Pathogenesis and Histogenesis of the So-called "Sarcome Angioplastique."—K. Wlassow¹ (Moscow) describes the "sarcome angioplastique," a testicular tumor stated by Malazzez and Monod, as being composed of a protoplasmic network, with irregular spaces and trabeculas, the latter made up of anastomosing giant-cells. He considers this tumor of the testicle to be an epithelioma sui generis which develops from imperfectly differentiated epithelial cells of the embryonal seminiferous tubules, and their intertrabecular stroma is not, in contradistinction to carcinomas, a result of the proliferation of pre-existing connective tissue, but rather the product of embryonal mesodermic cells. Metastases, just as in epitheliomas of the chorion, do not contain newly formed stroma nor alveoli. The author proposes the name of "epithelioma syncytomatodes testiculi" for this tumor, to differentiate it from other epithelial tumors of the testicle.

Fibroma of the Ovary.—From a study of the recorded cases of ovarian fibromas and 7 cases of his own, J. S. Fairbarn² (London) thinks it possible to recognize 3 ways in which a newgrowth of a fibromatous or fibromyomatous character may involve the ovary. (1) The whole ovary may be converted into a hard tumor, maintaining to some degree its original shape, but leaving no recognizable portion of the original structure. This is the usual occurrence; only one of his specimens belonged to this group. This complete fibrous transformation does not depend on the size the tumor has obtained. It takes place in small as well as in large tumors, and does not depend upon the growths having reached a size sufficient to destroy the ovary. It is difficult to understand why the pathologic change should affect the whole stroma from the first, as this is more like an inflammatory fibrotic change than a newgrowth. (2) The growth forms a hard tumor within the ovary,

¹ Virchow's Archiv, 1902, clxix, 220.

² Jour. of Gyn., of British Empire, 1902, ii, 250.

remaining more or less encapsulated within it. The amount of ovarian tissue remaining appears to depend rather on the position of the growth in the ovary, than on the size the growth has attained. With the increase in size of the tumor the capsule tends to become more thinned out and less separable, so that the encapsulation may be recognizable only near the attachment of the ovary. As 6 of his 7 cases belong to this type, this bears out Virchow's statement, who says that this is the most common form. The growth often originates in the outer end of the ovary. Myomatous tumors usually originate from near the insertion of the ovarian ligament where its bundles of muscle-fibers pass into the ovarian stroma. (3) The newgrowth forms a pedunculated tumor attached by a pedicle to the ovary. Some of these growths may be from the ovarian ligament, others from the fibrous capsule of the ovary.

A case of multiple fibroma (fibroneuroma) of the nerves of the lower extremities, with diffuse enlargement of the sciatics, is reported by J. H. Larkin¹ (New York). The case was complicated by sarcoma and metastases in the lungs, and was of especial interest in showing the bilateral condition of tumor-growth on the sciatic nerves, and also in that it was an admirable example of that class of cases described by Garrè, in which there exists a congenital predisposition for nerves to undergo diffuse sclerosis, to sarcomatous metaplasia, and to the formation of metastases.

THE BLOOD AND DUCTLESS GLANDS.

Ring Bodies (Nuclear Remnants?) in Anemic Blood.—R. C. Cabot² (Boston) describes certain ring bodies that he has found by means of Wright's stain in the erythrocytes in 3 cases of pernicious anemia, 3 cases of lead-poisoning, and 1 case of lymphatic leukemia. For the most part the bodies stained red, although occasionally a blue ring was encountered. Some were present with and some without basophilic stippling of the rest of the corpuscle. They varied much in appearance. Sometimes they were small, corresponding approximately to the size of the nucleus of a normoblast; sometimes they were situated peripherally; occasionally they were intertwined in very bizarre fashion; sometimes they appeared as figure-of-eight-shaped bodies; sometimes they were hook-shaped; and sometimes they were apparently made up of twisted threads. Cabot believes that they are not a mark of cellular degeneration, since they are associated most closely with three manifestations of cell-regeneration—that is, nucleated red cells, polychromatophilia, and ordinary granular stippling (which Cabot is inclined to look upon as indicating unripe, rather than overripe, cells). Cabot believes that the best hypothesis to account for these appearances is that they represent nuclear remains—that is, portions of the nucleus especially resistant to the action of whatever force it is that destroys the nucleus and ultimately the cell itself. The significance of their red color with Wright's stain, a

¹ Jour. Med. Research, 1903, ix, 217.

² Amer. Med., 1902, iv, 967; Jour. Med. Research, 1903, ix, 15.

stain which never stains any nucleus red, is not clear. It is not known whether they possess any practical significance.

The Pathology of Pernicious Anemia.—A. S. Warthin¹ (Ann Arbor) has made an exhaustive study of the pathology of pernicious anemia, reporting 8 cases with necropsies. After discussing the disease fully, he draws the following conclusions: Pernicious anemia is essentially a hemolytic disease, the hemolysis being due to some as yet unknown poison; whether autointoxication or infection remains to be determined. This poison stimulates the phagocytes of the spleen, lymph and hemolymph glands, and bone-marrow to increased hemolysis (cellular hemolysis). Either the phagocytes are directly stimulated to increased destruction of red cells or the latter are so changed by the poison that they themselves stimulate the phagocytes. The hemolysis differs only in degree, not in kind, from normal hemolysis. It is not improbable that from the destruction of hemoglobin poisonous products (histon) may be formed which have also hemolytic action. The hemolysis is not confined to the portal area, but also takes place in the prevertebral lymph and hemolymph nodes and bone-marrow. The spleen is the chief seat of blood-destruction. No evidences of hemolysis in the liver, stomach, or intestinal capillaries were found in the 8 cases. Only slight reaction for iron is found at the seat of actual hemolysis. The greater part of the pigment in the phagocytes of the spleen, lymph and hemolymph glands does not give an iron reaction while in a diffuse form. When changed to a granular pigment the iron reaction may usually be obtained. The change to hemosiderin is for the greater part accomplished by the endothelium of the liver and kidneys. The changes in the hemolymph glands found constantly in these 8 cases were: dilation of the blood-sinuses and evidences of increased hemolysis; great increase in size and apparent increase in the number of the hemolymph glands. In some cases there was no hyperplasia. The changes found cannot be regarded as specific of pernicious anemia. The lymphoid and megaloblastic changes in the bone-marrow do not form an essential part of the pathology of pernicious anemia, and are to be regarded as of a compensatory nature, an increased activity of red-cell formation to supply the deficiency caused by the excessive hemolysis.

The Formation of Hemolymph Glands from Adipose Tissue in Man.—D. J. McCarthy² (Philadelphia) discusses the formation of hemolymph glands from adipose tissue occurring in 2 cases of adiposis dolorosa. It is believed that the first step in the process is probably a chemic change in the fat preliminary to resorption, since D. L. Edsall found a distinct change in the acid values of the fat as compared with the fat outside of the nodules. This process of resorption of the fat is also assisted by large round vesicular cells, analogous to the compound granule cells of the central nervous system. The fat becomes lighter in color, the outlines of the cells become irregular in shape, and at the junction of the cells several nuclei may be seen in a stellate mass of protoplasm. At the same time the capillaries of the capsule and trabeculas extend into this.

¹ Am. Jour. Med. Sci., 1902, cxxiv, 674.

² Jour. Med. Research, 1903, ix, 241.

area, and large numbers of the proliferating vessels may be seen in a small space. Here and there accumulations of small round nucleated cells are to be seen around these vessels. As the process advances these accumulations of cells become larger and closer together; the capillary channels widen; the loose fat reticulum assumes a closer type, due to the proliferation of its own cells and the newly formed blood-channels; the spaces of the reticulum are now filled with the small nucleated type of cell, and the new tissue may be said to be complete so far as the functioning tissue is concerned. While most of the cells follow the type of the lymphocyte, large plasma-cells are occasionally seen and a type of cell which gave some of the staining reactions of nucleated red blood-corpuscles.

Acute Lymphatic Leukemia without Enlargement of the Lymph-glands.—Dorothy M. Reed¹ (Baltimore) has studied a case of acute lymphatic leukemia without enlargement of the lymph-glands, in which lymphadenoid degeneration of the bone-marrow was the noteworthy anatomic lesion. Reviewing some recent literature, in connection with the study of her own case, she expresses the belief that a lymphocytosis may arise from proliferation of the bone-marrow and death occur before any other organ in the body shows involvement. While not disposed to state positively that the lymphocyte of the blood comes from the bone-marrow, she believes that there is no proof that the lymphocyte comes from the lymph-gland exclusively, and that all the other colorless cells of the adult blood originate in the bone-marrow from lymphoid cells. The similarity in form of the small lymphoid cells in her case with the normoblasts which were conspicuously few in number, was suggestive, and led her to the opinion that it is not impossible that the increase was in a mother-cell, from which the lymphoid cell and the hemoglobin-containing cell are normally derived. She believes further that acute leukemia is due to changes in bone-marrow, the other organs being affected secondarily, if at all, and that based upon the blood picture, there are 3 forms of leukemia (all myelogenous), which should be known as the myelocytic, lymphoid, and mixed-cell. The nature of the disease, the etiology, and the primary focus in the body are believed to be still undiscovered—leukemia being simply the manifestation of some poison which affects especially the bone-marrow, the blood-forming organ in the adult, and ultimately causes death.

The Myelogenous Origin of Acute Lymphocytic Leukemia.—A. O. J. Kelly² (Philadelphia) reports the results of a clinical and anatomic study of 4 cases of acute lymphocytic leukemia, with reference to its myelogenous origin. He states that the following have rendered untenable the sharp clinical and anatomic distinction between lymphatic and myelogenous leukemia, insisted upon by Ehrlich and his school: (1) The occurrence of cases of lymphatic leukemia with little or no enlargement of the lymph-glands. (2) The demonstration of the predominance

¹ Am. Jour. Med. Sci., 1902, cxxiv, 653

² Trans. Assoc. Am. Physicians, 1903, xviii, 481; Univ. of Pa. Med. Bull., 1903, xvi, 270.

of lymphadenoid changes in the bone-marrow in every case of lymphatic leukemia in which the bone-marrow has been studied—an opinion first emphasized years ago by Neumann. (3) The fact that the differences between the lymphocytes and the granulocytes are of degree rather than of nature. Since the lymphocytes are unquestionably ameboid, some of them possess granules, and there is some evidence of the occurrence of an active lymphocytosis. (4) The fact that clinically, as well as anatomically, there is no sharp dividing line between the two types of the disease. Since atypic and transitional (intermediate or mixed) forms occur, and while we have hitherto thought that acute leukemia is always lymphocytic, and chronic leukemia either lymphocytic (the rarer form) or myelocytic (the common form), apparently trustworthy evidence has recently accumulated that tends to show that acute leukemia may be, though rarely, myelocytic, and, contrary to the rule, certain of the chronic lymphocytic cases reveal an unusually large number of large lymphocytes and some of the apparently acute cases may be of the small lymphocyte type. (5) The fact that the lymphocytes and the granulocytes (myelocytes and granular cells of the blood) develop from a common ancestor in the bone marrow—a large mononuclear, nongranular cell. It is said that there is good evidence for believing that whether or not the lymph-glands are enlarged, the typical leukemic blood-picture does not develop until the bone-marrow becomes affected; that the bone-marrow lesions are the essential lesions, and that therefore both types of leukemia are myelogenous. The terms lymphocytic and myelocytic are preferred as suggesting the distinguishing features of the bone-marrow proliferation and the blood-changes in the two types of the disease. All cases of leukemia are believed to be the result of chemotaxis—the different nature of the chemotactic agent being responsible for the varying sort of bone-marrow proliferation. The recent work of Pappenheim, Walz, Michaelis and Wolff, and others is reviewed.

Hodgkin's Disease (Pseudoleukemia).—Dorothy M. Reed¹ (Baltimore) has made a study of 8 cases of Hodgkin's disease with special reference to its relations to tuberculosis. The essential lesion is said to be an overgrowth of the endothelial cells of the lymph-glands, a growth closely resembling a chronic inflammatory process rather than a neoplasm. There is a great increase of fibrous tissue; eosinophilic cells, apparently attracted by chemotaxis from the blood-vessels, are usually present in large numbers, and giant-cells derived from the endothelial elements and containing single or multiple nuclei are also found. It is believed that Hodgkin's disease has no relation to tuberculosis, although tuberculosis may occur as a terminal infection. Inoculation experiments failed to show the tuberculous nature of any of the cases investigated. Reed would restrict the term Hodgkin's disease to a clinical and pathologic entity of unknown etiology, the main features of which are painless progressive glandular enlargement, usually starting in the cervical region, and without the blood-picture of leukemia. It is said that the microscopic examination is sufficient for the diagnosis,

¹ Johns Hopkins Hosp. Reports, 1902, x, 133.

which, however, may be confirmed, if necessary, by the negative results of inoculation experiments. C. C. Simmons¹ (Boston), from a pathologic analysis of 9 cases, reaches the conclusion that Hodgkin's disease should be regarded as an entity; that it presents a definite histologic picture; and that it has no relation to leukemia or tuberculosis, although the latter may be coexistent. Histologically the process consists essentially of a proliferation of the reticulum, with a resulting marked increase of fibrous tissue, and a corresponding decrease in the cellular elements. Eosinophilic cells are often, though not always, present. On the contrary, Joseph Sailer² (Philadelphia), reporting 4 cases of lymphatic tuberculosis that resembled pseudoleukemia, reviews the literature, and suggests that most, if not all, of the cases of pseudoleukemia are tuberculous in nature. Still another opinion is entertained by Pappenheim,³ who regards Hodgkin's disease as a preleukemic or aleukemic stage of true leukemia, believing that the blood-changes characteristic of lymphocytic leukemia do not develop until the bone-marrow becomes involved. [The contention regarding the use of the term Hodgkin's disease is doubtless attributable to the different points of view from which it is approached. In view of the obscure etiology of most of the cases, little can be postulated with certainty. It seems that many cases clinically Hodgkin's disease are tuberculous in nature; others may be syphilitic; some are probably a preleukemic or aleukemic stage of true lymphocytic leukemia; some are instances of true tumor-formation; while others may be what Reed and Simmons are disposed to look upon as true Hodgkin's disease. The entire subject of lymph-gland diseases is much in need of further elucidation.]

Amphophile Leukocytogenesis in the Rabbit.—W. R. Brinckerhoff and E. E. Tyzzer⁴ (Boston) have investigated exhaustively the amphophile leukocytogenesis in the rabbit, the investigation comprising a thorough study of the leukocytes of the circulation, the structure of the bone-marrow, the cytology of the bone-marrow, the amphophile series in the bone-marrow and the circulation, and the histology and cytology of the mesentery and the omentum. The interesting result of their experiments was that they found that during the early stages of a mild peritonitis, induced by the injection of dilute suspension of turpentine, the amphophile leukocytes accumulate in the vessels of the mesentery and emigrate into the extravascular tissue; that during this time the number of amphophile leukocytes in the peripheral blood suffer a diminution, followed by an increase; and that the bone-marrow becomes depleted of adult amphophile leukocytes. When hot salt solution was used to cause the peritonitis, the phenomena were essentially the same; but in two instances the number of amphophiles did not show an increase. The mesentery and bone-marrow showed the same changes as before. The cell-richness of the marrow in adult amphophiles is not notably affected by a short period of fasting, by feeding, by pregnancy, or by a relatively chronic infection with "snuffles."

¹ Jour. Med. Research, 1903, ix, 378.

³ Zeit. f. klin. Med., 1902, xlvi, 216.

² Phila. Med. Jour., 1902, ix, 615, 669.

⁴ Jour. Med. Research, 1902, viii, 449.

They conclude that the bone-marrow is the place of origin of the amphophile leukocytes of the rabbit, and that the supply of amphophile leukocytes of the blood is under the control of three factors: chemotactic, which have to do with the movement of adult amphophiles from the marrow to the blood-stream; differentiative, which have to do with the differentiation of the undifferentiated marrow-cells into the adult amphophiles; and proliferative, which cause mitosis in the marrow-cells of the amphophile series, particularly the myelocytes. In short, the phenomenon of amphophile supply and of amphophile leukocytosis on analysis is divisible into cell-motion, cell-differentiation, and cell-multiplication. In the experiments detailed the writers sought to make prominent the motor phenomenon. Normal marrow, with its diversity of cell-contents, shows particularly the phenomenon of cell-differentiation. The hyperplastic marrow of continued leukocytosis emphasizes the part played by cell-multiplication.

Thrombi Composed of Agglutinated Red Blood-corpuscles.—Simon Flexner¹ (Philadelphia), from a study of the agglutination of red blood-corpuscles in bacterial and nonbacterial diseases, concludes that such agglutination *intra vitam* is not uncommon in infectious diseases in man and animals, and that a special variety of thrombi is produced through this agglutination which may be denominated agglutinative thrombi. When such thrombi are old, or when the agglutination is compact, they may present the appearances to which the name "hyaline thrombi" has been applied. Other and more obscure alterations of the blood arising in infectious diseases may bring about agglutinative thrombosis; poisons which destroy corpuscles rapidly are provocative of agglutinative thrombosis; and it is probable that the so-called "fibrin ferment thrombi" are nothing else than agglutinative thrombi.

The Ability of Lymphocytes to Migrate.—J. Almqvist² (Stockholm) injected cultures of diphtheria and pseudodiphtheria bacilli into the peritoneal cavity of rabbits for the purpose of studying the bacteria and the exudate produced. Every 10 to 20 minutes serum was removed from the peritoneal cavity. The first test-solution contained no leukocytes, the second a few, and gradually they increased more and more. The varieties of leukocytes included polynuclear, large mononuclear, transitional forms, and small lymphocytes. The latter could not have been due to proliferation of the fixed cells of the peritoneum nor to cells having come through the peritoneal stoma, but must have come from the circulatory stream. The author sees in these experiments chemotactic properties of the bacteria mentioned, as well as the active migrating ability of all varieties of leukocytes. [The ameboid activity of the lymphocytes is scarcely open to dispute at the present time.]

Blood-changes in Lead Anemia.—As evidence of a partial myeloid transformation of the splenic function, A. Wolff³ (Berlin) points to the hematologic changes in a case of lead anemia. The blood-count was: Red cells 50 to white cells 1, the former counting 1,250,000; 86 % of the leuko-

¹ Jour. Med. Research, 1902, viii, 316. ² Virchow's Archiv, 1902, clxix, 17.

³ Berl. klin. Woch., Sept. 8, 1902.

cytes were multinuclear neutrophile cells, 6 % were small lymphocytes, and 2 % were transitional forms. The spleen was not palpable. After death the medulla of the femur and that of the spleen were subjected to an exact examination. Macroscopically the former was of a red color. Stained by various methods, nongranulated cells were more numerous than granulated cells, which is different from the normal; since the blood showed considerable neutrophile leukocytosis, the stress of the production would be thrown on the marrow, and Wolff regarded the nongranulated cells as indifferent lymphoid cells, which have the power of further developing into granular cells. This suggested a certain insufficiency of the medulla of the bone toward the demand for granular cells, but it was so slight that the myelocytes did migrate into the blood-stream. The presence of nucleated red cells indicated the rapid destruction of red cells, making the absence of splenic enlargement inexplicable. Microscopically, besides the normal lymphoid cells without granulation there were in the spleen a fairly large number of granular cells; these were myelocytes. There were many nucleated red cells, which he considers absolute evidence of the myeloid function of the spleen. The case must be regarded as one in which the spleen vicariously took the place of the changed bone-marrow, and Wolf thinks that this is fresh evidence of a metaplastic, in distinction to the metastatic, explanation of leukemia.

Experimental Researches Concerning the Relations of Slight Infections to the Blood-forming Apparatus.—To determine the influence of very slight infections, so slight as not to produce any clinical symptoms, upon the bone-marrow and other blood-forming structures, F. Freymuth¹ injected varying quantities (as little as $\frac{1}{3000}$ of an öse) of a 24-hours-old culture of living typhoid bacilli intravenously into rabbits. The very smallest doses produced a very considerable proliferation of marrow-cells, changing the fat marrow into red marrow; mitosis of cells in both marrow and spleen was marked; leukocytes of all descriptions, but especially the lymphoid cells, were increased in number. Medium-sized doses produced a greater reaction in the bone-marrow than large doses, the toxins in such cases overpowering the activity of the structure. As the toxins had the same action as the living bacteria, he sees in this an explanation for the anemia and other inexplicable symptoms of chronic constipation.

Experimental Examinations Concerning Blood-changes after Bleeding.—H. v. Hoesslin² (Munich) experimented with rabbits, studying the osmotic pressure and quantity of albumin in the blood after varying losses. The blood was removed from the femoral artery, 10 cc. at a time, until death occurred. After the first bleeding the freezing-point of the blood sank in nearly all of the cases. Continuing the withdrawal of blood every 15 minutes, the freezing-point gradually rose, returning to normal at about the third bleeding; but even after that it continued to increase. The freezing-point was found lower in all cases in which the second bleeding was performed the day after. The albuminous constituents of the blood acted differently; they showed a

¹ Deut. med. Woch., 1903, xxix, 350.

² Deut. Arch. f. klin. Med., lxxiv, 577.

constant and consistent decline after losses of blood, not returning to normal in as short a time as the freezing-point. The hemoglobin and number of red corpuscles maintained a parallel with the quantity of albumin, true hypalbuminosis arising after serious losses of blood. These experiments show clearly the independence of the freezing-point from the albumin of the blood.

The Action of Arsenic on the Bone-marrow.—R. Stockman and F. J. Charteris¹ (Glasgow) state that in small repeated doses arsenic acts on the bone-marrow, causing increase in the number of leukoblastic cells, little or no change in the number of erythroblastic cells, marked hyperemia, and atrophy of fat-cells. During this stage there is no increase in the red corpuscles or hemoglobin of the blood. In repeated doses large enough to cause cachexia and emaciation, the bone-marrow undergoes hyaline degeneration, which is accompanied by decrease of the red corpuscles and hemoglobin of the blood. All of these changes occur with other drugs and poisons, and are not peculiar to arsenic. Arsenic has no direct effect in increasing the production of red blood-corpuses by the bone-marrow. The "hematinic" action of arsenic in pernicious anemia, malaria, lymphadenoma, leukemia, and some other diseases probably results from a specific action on the parasites which cause these diseases, and not from any direct action on blood-formation.

Structure of the Thyroid in the Newborn.—G. G. Perraudo² (Sassari) writes concerning the structure of the thyroid in the newborn. There appear to be fewer variations in the glandular structure of the thyroid in man than in that of other animals. The thyroid body of the female fetus is larger than that of the male. Pathologic conditions of the mother and of the fetus have great influence on the weight of the fetal thyroid, augmenting it usually in cases of syphilis, diminishing it in cachectic states and in athrepsia. The first act of respiration brings about no appreciable change in the structure or the secretory activity of the thyroid. The state of asphyxiation in the fetus generally produces a colloidal hyperdistention of the follicles. Normally the amount of colloidal secretion in the lymphatic spaces is scant in the fetus, and if it is much augmented it is an indication of a pathologic condition. Many diseases of the mother and the fetus, especially syphilitic infection, are capable of producing induration, and more or less accentuate retardation or retrogression in the histogenesis of the thyroid. Hereditary syphilis, on the other hand, may give rise to marked, and at times to enormous, enlargement of the organ through a conspicuous formation of fibrocellular elements. Augmentation of the fibrocellular tissue is not always an expression of atrophic glandular conditions. It is difficult to find syphilitic granulations or gumma in the thyroid; on the other hand, typical syphilitic alteration of the vessel walls are easily found.

Accessory Thyroid.—M. Crispino³ furnishes an interesting contribution to the histology of the accessory glands or satellite organs of the

¹ Jour. Path. and Bact., 1903, viii, 443.

² Studi Sassaresi, vol. ii, sect. ii, No. 1; Amer. Med., Sept. 6, 1902.

³ Il Policlinico, June, 1902.

thyroid gland, the parathyroids, the thymic granules, and the epithelial cysts. The paper considers in detail the parathyroids as recognized in man by Sandstrom in 1880, and afterward described in the dog, cat, rabbit, horse, and ox, and in many other animals by Gley and by Cris-tiani, their value being first pointed out by Baber in 1881, and by Rogo-witsch in 1882. Crispino concludes that the parathyroids do not represent embryonic structures normally destined to become thyroid gland tissue, but holds them to be histologically distinct from, though in intimate relation with, the thyroid. The thymic granules were discovered in man by Lupo, in 1888, the discovery being confirmed by Müller in 1896 and by Verdun in 1897, the structures being afterward described by Kohn, Zienlinska, and Verdun, for cats, dogs, sheep, rats, and moles. These lobulated ganglions are considered by Kohn as rudimentary organs having a special embryonic role. Histologically, they are unlike thyroid tissue and appear to be of a lymphatic character. The epithelial cysts which are annexed to the organs of the thyroid region were first pointed out by Remach, in 1843. They seem to be of three kinds—epithelial retention-cysts, thymic cysts, and embryonal cysts. The paper is accompanied by an exhaustive bibliography. E. L. Shurly¹ (Detroit) reports a case, in which the pharynx was filled with a smooth, broadly pedunculated tumor, which was attached to the base of the tongue. It was removed and microscopic examination proved it to be an accessory thyroid. Myxedema developed, thus indicating abnormality in the functional activity of the true thyroid, although no atrophy was evident. [Reports of cases of accessory thyroid in the region of the pharynx are becoming quite numerous, but this is one of the first in which removal was followed by myxedema.]

Anatomic Changes in Various Organs after Thyroidectomy.—W. Benson² (Würzburg) has fed normal and thyroidectomized rabbits with thyroid extract and thyroidin and also removed the thyroid gland in some rabbits without feeding them the animal extract. He concludes from his results that in rabbits after thyroidectomy a poison is either produced or retained which causes colloidal degeneration of the protoplasm of the cells, especially of the cells of the liver, kidney, and heart-muscle; this terminates in the destruction of the cells. Feeding with thyroid extract prevents, or at least retards, these changes. Thyroid extract in normal animals produces enteritis, nephritis, and hepatitis. Colloid particles are also secreted; they are most probably due to an overproduction of the material.

Relation of the Thymus Gland to Marasmus.—W. R. Stokes, J. Ruhrah, and C. W. G. Rohrer³ (Baltimore) have studied the thymus gland in relation to the nutritive state of childhood, and have found the capsule and trabeculas thickened, the lobule cut up into irregular masses, increase of connective tissue around blood- and lymph-vessels, diminution in size of the lymphoid spaces, increase in endothelial cells lining the spaces, and various gradations of atrophy to entire destruction of the

¹ Phila. Med. Jour., Sept. 13, 1902.

² Virchow's Archiv, 1902, clxx, 229.

³ Am. Jour. Med. Sci., 1902, cxxiv, 847.

glandular tissue. They conclude that atrophy of the thymus gland is always found in cases of infantile atrophy; the condition of the thymus is an index of the general nutrition of the infant; the state of nutrition of infants may be estimated by a microscopic examination of the thymus at autopsy. [If an etiologic relationship could be established between thymus atrophy and marasmic conditions, a new path in therapeutics might be opened.]

The Thymus Gland and Sudden Death.—M. Penkert¹ (Greifswald) supports the theory that an enlarged thymus is capable of producing death, believing that of itself it may give rise to difficulties in respiration, and even completely compress the trachea, and thus indirectly cause air-hunger and death.

Antitoxic Functions of the Suprarenal Capsules.—R. Oppenheim² (Paris) has attempted to determine the conditions under which the suprarenal bodies exercise their antitoxic power. He concludes that suprarenal extract, if mixed with substances of a toxic nature or if injected into animals simultaneously with such toxic substances, increases in many instances the resisting power of the organism to intoxication. Results vary with different poisons. Almost no result is noticed when the poison is strychnin or atropin, but the antitoxic action is striking in the case of phosphorus or of the toxic substances contained in the human urine. Unilateral decapsulation increases organic resistance to intoxication, especially, however, in diphtheria infection and phosphorus-poisoning. This is due to the enormous hypertrophy and hyperactivity of the gland which is left after its fellow is removed. The symptom-complex of acute insufficiency of the suprarenal bodies has been observed from time to time in infants. Following such an attack lesions of this gland may remain latent, but may manifest themselves, when an intercurrent intoxication occurs, by the failure to destroy the poisons then introduced into the system. In the presence of diseased suprarenal bodies a common tonsillitis may become a rapidly fatal disease, while in an otherwise normal individual a similar intoxication would have a benign course. [It is possible, as suggested by one of the editors, that myasthenic conditions may be due to insufficiency of the suprarenal bodies.]

Hemorrhage into Suprarenal Glands.—M. Simmonds³ (Hamburg) reports a case of apparent peritonitis with death resulting 2 days from onset of symptoms. The necropsy showed extensive hemorrhage into both suprarenal glands, which was probably due in this case to thrombosis of their veins. He has collected all the cases of hemorrhage into the organ and finds that small ecchymoses of the suprarennals are common in various infectious diseases and are probably toxic; that bilateral hemorrhagic infarcts usually lead to peritonitis, collapse, and death; that suprarenal hemorrhage may form a large hematoma; that the hemorrhages may be due to traumatism, venous thrombosis, bacterial capillary emboli, and hemophilia; that in cases of venous thrombosis it may affect the main vein or one of the smaller tributaries; such hemorrhages must be

¹ Deut. med. Woch., Nov. 6, 1902.

³ Virchow's Archiv, 1902, clxx, 242.

² Thèse de Paris, 1902.

considered marantic; that bacterial emboli may occur in cases that are not septic; and that extensive hemorrhages may destroy the entire organ.

Ectopia of the Adrenal.—Radasch¹ discusses the histology and the histogenesis of the adrenal, and after citing the cases of ectopia of the adrenal hitherto reported, reports a personal observation of ectopia of that organ (in the kidney and in the liver). His conclusions are: (1) Ectopic adrenals are found in both sexes and all ages. (2) Their occurrence is far more frequent than formerly supposed. (3) Although they vary in size, most of them conform to the general description of yellowish, oval, or globular bodies which in section show a light periphery and a dark center. (4) Microscopically these bodies consist of 2 or 3 zones of the cortex of the adrenal, but seldom of the medulla. (5) The separation of the masses occurs early, before the inclusion of the medulla by the cortex of the normal gland. (6) The distribution varies greatly, the usual location being some point between the kidney and the descended sexual gland. To this may be added unusual locations—the under surface of the liver and also within the organ.

THE CIRCULATORY SYSTEM.

The Heart in Acute Disease.—J. M. Cowan² (Glasgow) states that in acute disease generally, the heart is liable to be affected in various ways, and all the different elements—muscle, endothelium, connective tissue, and vessels—may be injured. Alterations in the muscle-cells constitute the most frequent and the most important change. Granular degeneration is almost always found, and has as its result a loss of fibril bundles and a marked weakening of the power of the heart. Fatty degeneration is not rare, but its connection with acute disease is not necessarily close, as it is more often produced by other causes which may have been active before the onset of the fatal illness. Hyaline changes are found occasionally, but are rarely extensive. They are probably the result of concentrated toxic action, and their occurrence is often favored by vascular or other local conditions. When the pericardium or endocardium is inflamed, there is grave interference with the muscle in the vicinity, an interference which is at once apparent, and may continue after the cessation of the acute attack. The connective tissues may be the site of inflammatory or degenerative changes, the former of which may be the starting-point of chronic fibrous changes in the myocardium. Acute disease may affect the vessels in various ways, and be the origin of chronic degenerative processes in them. The effect of acute disease upon the heart is thus widespread, and has an effect both during its continuance and after it has ceased to act, as it may be the starting-point of chronic changes which seriously interfere with cardiac action, and even lead directly to death.

Pathology of Fatty Heart.—Leick and Winkler³ fed dogs on mutton

¹ Am. Jour. Med. Sci., cxxiv, 286, 1902. ² Jour. Path. and Bact., 1903, ix, 87.

³ Arch. exper. Path. u. Pharm., 1902, xlvi, 163.

fat and found that the fat which accumulated in the muscle-fibers of the heart under the influence of phosphorus-poisoning was similar in type to mutton fat. They therefore hold the view that in fatty degeneration of the heart and other organs the true pathology of the condition is to be found in the inability of the cells to use the fat which is brought to them for combustion. According to this view, the presence of an excess of fat is evidence of disordered function of the cells, but is not, or only in a secondary degree, due to local disintegration of the protoplasm.

Aneurysmal Dilatation of the Ductus Arteriosus.—O. H. Schultze¹ (New York) reports such a case. The duct was dilated and filled with a recent clot. Its pulmonary end was closed, its aortic end open. It was 1 cm. wide, presenting the condition of a sacculated aneurysm in the anterior mediastinum. It was in contact with the phrenic and pneumogastric nerves, and had probably compressed them.

Persistence of Ductus Arteriosus Botalli.—Camp² (Berlin) records a striking instance of the hereditary factor in congenital heart-disease in the cases of 6 children of one family, all of whom showed signs and symptoms indicating the presence of a persistent ductus Botalli. This was also demonstrated by means of the Röntgen rays.

The Behavior of Bloodvessels after Section of their Nervi Vasorum.—L. Jores³ (Bonn), to determine the state of the bloodvessels after section of their nervi vasorum, resected the cervical sympathetic in rabbits on one side. The dilation of the vessels of the affected side was easily noted, but no other change, especially no proliferation of the intima, could be made out either with the naked eye or with the microscope. The animals were killed after lapses of time varying from 2 to 9 months. The experiments seem to disprove Thoma's theory, according to which a slowing of the circulatory stream over a prolonged period of time produces proliferation of the intima and endarteritis.

Obstruction of the Inferior Vena Cava.—W. C. Bosanquet⁴ (London) reports 2 cases of obstruction of the inferior vena cava, one due to a thrombosis, the other to gummatous infiltration of the walls at two points (3 inches below the liver and where the vein entered the liver). There were numerous gummas throughout the liver.

Congenital Heart-disease.—E. Cautley⁵ (London) reports an uncommon case, atresia of the conus pulmonalis and patency of the septum ventriculorum without any malformation of the pulmonary valves or artery. The condition was probably syphilitic.

Endocardial Thickening and Opacities.—G. Herxheimer⁶ (Frankfurt-a.-M.) has examined 4 hearts with especial reference to opacities (milk spots) and thickenings. He considers the former as of mechanical origin, the primary change being an injury to the endothelium which leads to a diminution of resistance of the underlying muscular tissue and to inflammation; proliferation and secondary atrophy of the muscular tissue precede the formation of the scars. Concerning the

¹ Med. Rec., Aug. 9, 1902.

² Berl. klin. Woch., Jan. 19, 1903.

³ Ziegler's Beitr., 1902, xxxii, 106.

⁴ Edinb. Med. Jour., 1902, liv, 257.

⁵ Edinb. Med. Jour., 1902, liv, 250.

⁶ Ziegler's Beitr., 1902, xxxii, 461.

endocardial thickenings, as seen, for instance, on the septum just below the aortic leaflets in aortic insufficiency, he believes that they are entirely analogous in formation to the milk spots, but in these the heart-muscle is oftener involved than in the former.

Gonococcic Endocarditis with Cultivation of the Specific Organism from the Blood during Life.—N. M. Harris and W. B. Johnston¹ (Baltimore) report a case of gonococcic endocarditis. Twenty-four hours before death a blood-culture was made and from it the gonococcus was cultivated. The pathologic examination showed vegetative endocarditis affecting the mitral valve, edema and induration of the lungs, acute splenic tumor with infarction, and subacute nephritis with infarction. Gonococci were cultivated from the vegetations and the heart's blood. The authors say that in cultivating the gonococcus from the blood during life it is not necessary to use a large amount of blood, or to dilute the blood greatly, or to employ any specially prepared medium. It is more advantageous to mix the blood with melted agar and plate the same than to use the fluid media, where oxygen-supply is more restricted. The time selected for making a culture in relation to the course of the disease is an important factor. The bactericidal power of the blood has little effect in retarding the growth of the gonococcus.

Case of Thrombosis of the Cerebral Veins and Sinuses Associated with Bronchopneumonia.—T. Fisher² (Bristol) reports a case of thrombosis of the cerebral veins and sinuses associated with bronchopneumonia. The upper two-thirds of the left parietal lobe were much swollen and softened. There was no trace of meningitis. The only other organ which presented anything noteworthy was the left lung, the lower lobe of which was solid throughout, and the posterior half of the upper lobe was also consolidated. The consolidation had the appearance of confluent bronchopneumonia, and microscopic examination proved it to be the catarrhal form. Cover-slip preparations taken from the thrombus in the superior longitudinal sinus showed the presence of a diplococcus which stained by Gram's method. It grew in cultures like *Diplococcus pneumoniae*. *Staphylococcus pyogenes aureus* was also present.

Obliteration of the Innominate Artery.—H. Thursfield³ (London) reports the case of a man who died from the rupture of an aneurysm. The aortic arch presented a diffuse nodular thickening without calcification. The orifice of the left carotid was a mere pinhole; that of the innominate was quite occluded and although there was no thrombus in the vessel. The disease was an obliterating arteritis.

Two Aneurysms in a Single Heart.—L. M. Loeb⁴ (Chicago) describes a heart weighing nearly 1000 grams, and showing the following pathologic processes: Dilation aneurysm of the left ventricle at the apex; dissecting aneurysm of the aorta leading into the wall of the left ventricle; fibrous obliterative pericarditis. The enormous hypertrophy was most likely due to the adhesive pericarditis. The sclerotic aorta could not

¹ Johns Hopkins Hosp. Bull., 1902, xiii, 236.

² Brit. Med. Jour., Dec. 6, 1902.

³ Brit. Med. Jour., Sept. 27, 1902.

⁴ Amer. Med., Sept. 20, 1902.

withstand the increased blood-pressure, resulting in the aneurysm at the base. This pressed upon the left coronary artery, interfered with the chief source of blood-supply for the apex, and the tugging of the diaphragm and greatly increased blood-pressure were sufficient to cause the second aneurysm.

Rheumatic Myocarditis.—T. Fisher¹ (Bristol) reports 2 cases. In the first, fatal cardiac failure was associated with well-marked signs of rheumatism, and the cause of the cardiac failure was found to be fatty degeneration of the heart, which he attributes to the rheumatism. In the second case the symptoms clinically were those of chronic disease of the mitral valve, but after death the heart was found to be greatly dilated, and the mitral valve, although thickened, presented no lesion which could account for the death. Fibroid disease and fatty degeneration of the myocardium were, however, present, both of which were probably produced by rheumatism.

F. J. Poynton² (London) reports a series of clinical and anatomic observations illustrating the relationship between **myocardial alterations and the rheumatic poison**. He believes that dilation of the heart may occur independently of endocarditis and pericarditis, that it may be the first sign of rheumatic heart-disease, and that when it occurs with pericarditis and endocarditis it is not entirely a result of these inflammations, but a result of the rheumatic poisoning. The changes due to rheumatism may involve the cardiac muscle, and the bloodvessels and interstitial tissues. The changes affecting the heart-muscle are (*a*) fatty changes in the muscular fibers, not only close to the pericardium, but also scattered throughout the heart-wall, more especially in the neighborhood of the minute bloodvessels; (*b*) loss of striation, exaggeration of striation, and segmentation; and (*c*) nuclear changes—division of nuclei, hyperchromatosis, and possibly a granular change spreading from the poles of the nuclei. The changes involving the bloodvessels and interstitial tissue are (*a*) cellular exudation around the blood capillaries; (*b*) exudation into and swelling of the interstitial tissues, which may give rise to an appearance of an intramural nodule; and (*c*) in the chronic cases, perivascular fibrosis and the occurrence of newly formed strands of connective tissue running in the intermuscular septums, and replacing in part the muscular tissue.

Calcification of the Median Coat of Arteries of the Extremities and Arteriosclerosis.—J. G. Mönckeberg³ (Hamburg) has examined some 60 cases and has found that in the arteries of the extremities calcification of the media is much more common than arteriosclerosis. If these arteries can be felt as stiff, tortuous, fragile tubes they are more likely to show calcification than arteriosclerosis. Arteriosclerosis of central vessels can be inferred neither from the degree nor the extent of peripheral calcification; both conditions are frequently combined, but extreme calcification has occurred in peripheral arteries without the slightest sclerosis of deep vessels, an observation the editors have more than once confirmed.

¹ Brit. Med. Jour., Sept. 27, 1902. ² Internat. Clinics, 13th series, iii, 226, 1903.
³ Virchow's Archiv, 1903, clxxi, 141.

Syphilis of the Heart with Dilation of the Pulmonary Artery.—K. E. Wagner and G. I. Qwiatkowskii¹ (Kiew) report a case of cardiac disease attributed to an untreated syphilitic infection of 4 years' standing. The autopsy revealed gummas in all parts of the heart and a remarkable dilation of the pulmonary artery due to syphilitic endarteritis. The artery had a diameter of 12 cm. and its walls measured in places from 6 to 7 mm. The inner surface showed many syphilitic patches. Gummas were also found in lungs and liver.

Malformation of Tricuspid Leaflets.—P. Geipel² (Dresden) reports 3 cases of malformation of the tricuspid leaflets. All of them had a markedly enlarged right auricle. In 2 there was a broad band instead of 3 leaflets; in the third the leaflets had the form of a sac extending into the ventricle. Other malformations, *e.g.*, a patulous foramen ovale, were also present.

THE RESPIRATORY SYSTEM.

The Fats of Pneumonic Exudates.—H. A. Christian³ (Boston), from a study of tissue from ten pneumonic lungs and a review of the literature, reaches the conclusion that two kinds of fatty substances are present in pneumonic exudates. The one differs in some reactions from ordinary body-fats, appears early in the disease, and is in the main brought by the leukocytes from the circulating blood. The other is identical in reaction with ordinary body-fat, appears late in the disease, and has the same origin as the fat of the so-called fatty degeneration.

Autolysis in Lobar and Unresolved Pneumonia.—S. Flexner⁴ (Philadelphia) suggests that the cause of the nonabsorption of the exudate in an unresolved pneumonia may lie in imperfect autolysis in the inflamed lung. He points out that the fact that organs protected from decomposition undergo solution by a process of self-digestion was first accurately shown by Salkowsky in 1882, and that this process of autolysis has now been studied from many different sides. We have learned that in the intracellular ferments causing autolysis we possess a most important and potent series of agents which come into play under both physiologic and pathologic conditions. It is said that there is little doubt that in many pathologic conditions the leukocyte is the essential agent in bringing about absorption, and what is required is not living leukocytes so much as large numbers of these cells, since autolysis proceeds independently of the vitality, as such, of the cells. The different behavior of a caseous and a croupous pneumonia, the facility with which the one, and the difficulty with which the other, undergoes resolution, is probably to be ascribed, in large part, to the absence, in a measure, of leukocytes from the tuberculous process, and their presence in enormous numbers in the acute inflammatory condition. F. Müller first studied autolysis of the lung in croupous pneumonia, and described in detail its occurrence and the chemic

¹ Virchow's Archiv, 1903, clxxi, 369.

² Jour. Med. Research, 1903, x, 109.

³ Virchow's Archiv, 1903, clxxi, 298.

⁴ Univ. of Pa. Med. Bull., 1903, xvi, 185.

products, among which are lysin, leucin, tyrosin, purin bases, and phosphoric acid. Flexner found that it is in the stage of gray hepatization that autolysis takes place quickly and perfectly, while in the stage of red hepatization it is very imperfect—a fact that can, he believes, be attributed to the small number of pus-cells in the latter condition; but if the lung in unresolved pneumonia is exposed to conditions favoring autolysis, the process is slow and incomplete as compared with what takes place in gray hepatization. In gray hepatization autolysis after death is a mark of the tendency of the exudate during life to become absorbed; in unresolved pneumonia the absence or reduction of autolysis is equally an indication of the future fate of the exudate—namely, during life to undergo organization. Flexner, therefore, looks upon unresolved pneumonia as an acute lobar pneumonia, in which the inflammatory exudate, either because of some disproportion between the leukocytes and other constituents or other cause as yet unknown, cannot be absorbed, and hence undergoes organization.

Primary Carcinoma of the Lung.—J. H. Musser¹ (Philadelphia) reports 3 cases. One case of special interest resembled tuberculous bronchopneumonia clinically and anatomically, and it was only when sections were studied histologically that the true condition was revealed. The carcinoma, which evidently developed from epithelium of alveoli, appeared to involve the entire extent of both lungs simultaneously.

Primary Actinomycosis of the Lung.—S. Kashiwamure² (Japan) describes 4 cases of primary actinomycosis of the lung. In 2 cases the subpleural and retroperitoneal tissue as well as the vertebrae were involved; the third patient had metastatic abscesses of liver and spleen; the fourth patient had metastases of the epicardium, kidneys, spleen, and skin.

Glanders of the Lung.—W. G. MacCallum³ (Baltimore) describes the lesions in the lung of a man dying of glanders. The lungs contained numerous small, grayish-red, firm nodules. Similar nodes were found in the spleen and kidneys. *Bacillus mallei* was recovered from all the nodules. The nodules were found in three different stages of development. The earliest lesions showed the center of the nodule composed of masses of leukocytes, fibrin, epithelial cells, and debris, the alveoli in the immediate neighborhood being filled with plugs of fibrin. The central portion contained many bacilli. In the second stage the central necrosis was more marked, and the exudate in the surrounding alveoli showed beginning organization. Complete central necrosis surrounded by a capsule of organized connective tissue marked the third stage. Glanders, in the author's opinion, must therefore be considered a localized necrotizing bronchopneumonia. The connective tissue usually developed from the alveolar walls, occasionally from the walls of the small bronchi. The fibrin plugs connected the alveoli with each other, and the process of organization extended along them.

Pneumomycosis Aspergillina.—K. Hochheim⁴ (Göttingen) reports

¹ Univ. of Pa. Med. Bull., 1903, xvi, 289. ² Virchow's Archiv, 1903, clxxi, 257.

³ Ziegler's Beitr., 1902, xxxi, 440.

⁴ Virchow's Archiv, 1902, clxix, 163.

the case of a man who died of sepsis following a slight finger-wound. The autopsy revealed a number of old tuberculous foci in the lungs as well as several peculiar foci of yellowish-green color. Microscopic and cultural examinations showed the latter to be due to *Aspergillus fumigatus*. The microscopic examination showed that this organism invaded the lung through the respiratory tract. The kidneys, right temporomaxillary joint, and petrous portion of the temporal bone were the seat of streptococcal abscesses. The aspergillar foci did not contain tubercles, tubercle bacilli, or streptococci. A number of animal experiments were made to prove the pathogenicity of the fungus.

Transportation of Cellular Emboli through the Thoracic Duct into the Lungs.—W. G. MacCallum¹ (Baltimore) reports a case in which multiple hemorrhagic infarctions of the lung were produced by the plugging of the branches of the pulmonary artery with masses of cells of the type of the lymphoid cells and larger mononuclear phagocytic cells. He also saw these embolisms in other places without any resulting infarction. The cells evidently gain access to the veins by way of the thoracic duct, being carried through the subclavian vein, and reach the heart to be propelled into the lungs. He examined the thoracic duct of 3 cases, finding these cells in large masses.

Bacteriology of Suppurations of the Lungs and Bronchi.—H. Kerschensteiner² (Munich) has made very extensive studies of the flora of suppurative conditions of the lung and bronchi and has found that the only difference between the sputum of tuberculosis and other suppurations is the tubercle bacillus. The microorganism found oftenest in sputum, whether tuberculous or nontuberculous, is the streptococcus. In tuberculosis staphylococci, tetragenus, and diphtheroid organisms are very common; in nontuberculous sputum, tetragenus. Other micrococci, pneumococci, influenza bacilli, bacteria resembling the colon bacillus, are comparatively rare. In nontuberculous suppurations influenza bacilli and pneumococci occur more frequently; diphtheroid bacilli and staphylococci are quite uncommon. Streptothrix and blastomyces are very rare; acid-fast pseudotubercle bacilli and pyocyaneus bacilli were never found by him. Intratracheal injections of tubercle bacillus and *Micrococcus tetragenus* destroyed the lung-tissue of the rabbit very rapidly, a cavity forming within 4 weeks. The postmortem state was that of pure tuberculosis. The streptococcus from tuberculous sputum was found virulent for rabbits and slightly pathogenic for man. When injected subcutaneously a localized erysipelas was produced. Pseudodiphtheroid bacilli were always accompanied by Neisser's granules and acid fermentation. The presence of these conditions, therefore, is not utilizable for the diagnosis of Löffler's diphtheria bacillus.

Spontaneous Nontuberculous Pneumothorax.—M. H. Fussell and D. Riesman³ (Philadelphia) report 2 cases of spontaneous pneumothorax, which, as the patients recovered and remained well for a long period of

¹ Amer. Med., March 21, 1903.

² Deut. Arch. f. klin. Med., 1903, lxxv, 180 and 441.

³ Am. Jour. Med. Sci., Aug., 1902.

time, they believe were not of tuberculous origin. There was no evidence of tuberculous mischief in either case. The rupture of an emphysematous vesicle seemed to be the most likely cause of the condition, and is not necessarily an evidence of grave disease of the lung.

Empyema in Children.—D. Bovaird¹ (New York) has studied 101 cases of empyema from the standpoint of pathology. Seventy-seven were unilateral (36 right-sided, 41 left-sided), 24 bilateral. In 6, evidences of tuberculosis of lungs or pleura were found. The effusion varied in consistence with the proportion of serum, fibrin, and pus. Usually it was a thick, creamy exudate; its location of choice was the posterior region. In quantity it usually varied from 2 to 8 ounces. Lung-compression existed in 35, consolidation in 56 cases. Pericarditis, meningitis, and peritonitis were noted several times as complications. The pneumococcus was the most frequent organism isolated; next the streptococcus and the staphylococcus.

THE DIGESTIVE SYSTEM.

Hyperplasia of the Pharyngeal Lymphoid Tissue (Adenoids), with Special Reference to Primary Tuberculosis of the Pharyngeal Tonsil.—Lartigau and Nicholl,² from an extensive study of the subject and a thorough review of the literature, conclude that adenoids consist essentially of hyperplastic pharyngeal lymphoid tissue. Epithelial and fibrous-tissue changes are inconstant and variable. The newly formed fibrous tissue is largely perivascular in distribution. It may occasionally be one of the factors in the process of disappearance of the adenoid. The hyperplastic pharyngeal tonsil often contains microorganisms, and these are mainly pyococcal forms. The bacteria for the most part lie near the surface, and the infection usually occurs from the surface, with or without demonstrable lesion of the epithelium. Primary tuberculosis of adenoids is probably more common than most previous studies have shown. Sixteen per cent. of the authors' series contained tubercle bacilli, 10 % with characteristic lesions of tuberculosis. The tubercle bacilli were present in small numbers. The pharyngeal tonsil may be a portal of entry for the tubercle bacillus and other microorganisms in localized or general infections.

Primary Epithelioma of the Uvula and the Soft Palate.—J. F. McCaw³ (Watertown) reports a case of primary epithelioma of the uvula, velum palati, each posterior faucial pillar, and the right lateral and the posterior wall of the pharynx. The mass was irregular and nodulated, its surface ulcerated and necrotic.

J. P. Maul⁴ (Troy) reports a case of **congenital absence of the entire esophagus.**

Tuberculosis of the Esophagus.—W. T. Mullings and F. C. Shrub-sall⁵ (London) report a case of tuberculosis of the esophagus. The specimen was from a patient who had suffered from hydropneumothorax.

¹ Med. News, Sept. 13, 1902.

² N. Y. Med. Jour., Aug. 9, 1902.

³ Am. Jour. Med. Sci., 1902, cxxiii, 1031.

⁴ Am. Jour. Med. Sci., 1902, cxxiv, 304.

⁵ Lancet, Jan. 10, 1903.

During life the only evidence of esophageal lesion was dysphagia, which came on suddenly a few days before death. There was no evidence of pharyngeal ulceration, though early tuberculosis of the larynx was discovered. At the necropsy tuberculous lesions were found in the lungs, intestines, right testicle, trachea, and great bronchi. The extreme upper portion of the esophagus was not examined. The middle portion showed extensive ulceration over a length of $3\frac{1}{2}$ inches, the individual ulcers being oval with their long axis in the long axis of the tube. Below this there were a few scattered ulcers. Microscopically typical tubercles with giant-cells and tubercle bacilli were demonstrated. The case was one either of extension from the pharynx or of local infection from the sputum, the evidence being more in favor of the latter cause.

Fibromyoma of the Stomach.—J. D. Condit¹ (New York) reports a case of fibromyoma of the stomach. The small and oval tumor had a smooth surface and sessile base, and was fastened to the anterior surface of the stomach. It was hard and adherent to the mucous membrane, but protruded on the outer surface of the stomach. It was composed of irregularly interlacing bundles of fibrous tissue and smooth muscle surrounded by a capsule of connective tissue on the inner surface and externally blending with the muscularis of the stomach-wall. The part of tumor nearest mucosa showed a moderate amount of inflammation.

Behavior of Elastic Tissue in Gastric Carcinoma.—T. Snouye² (Berlin) has studied the behavior of elastic tissue in gastric carcinoma, staining with borax carmin, Weigert's solution, and chromic acid. The results of his examinations are that carcinoma displaces and destroys the elastic fibers and that rarely new fibers are formed within the tumor. The arrangement and distribution of these new fibers convince him that they arise from preexisting elastic fibers.

Hyperplastic Tuberculosis of the Vermiform Appendix.—Crowder,³ reporting a case and reviewing the literature, concludes that secondary tuberculosis of the appendix is a frequent condition and usually occurs by extension from the cecum; that primary tuberculosis of the appendix is a rare disease; that the tuberculous appendix may undergo hyperplastic changes similar to those occurring in other parts of the body, chiefly the cecum; that hyperplastic tuberculosis may be limited to the appendix, but that such limitation is very rarely met with; and that the etiology of tuberculosis as a distinctly hyperplastic process is not well understood.

Banti's Disease with Diffuse Productive Nephritis.—C. W. Field⁴ (New York) reports a case of Banti's disease in which there were purulent bronchitis, marked splenic enlargement, cirrhosis of the liver, and nephritis. The spleen showed marked increase of connective tissue, a thickened capsule, and a dilated vein. The liver was firm and pale, its capsule thick and smooth, its connective tissue markedly increased. The cortex of the kidney was swollen and anemic, the pyramids congested, and there were many punctate hemorrhages.

¹ Med. Rec., Aug. 9, 1902.

² Am. Jour. Med. Sci., cxxiv, 236, 1902.

³ Virchow's Archiv, 1902, clxix, 278.

⁴ Am. Jour. Med. Sci., 1903, cxv, 405.

Multiple Diverticulum of the Colon.—A case is reported by J. D. Condit¹ (New York). They were arranged in 2 irregular rows on either side of the mesenteric border and did not average much over 1 cm. in diameter. They occupied chiefly the walls of the transverse and descending colon, the sigmoid flexure, and the upper portion of the rectum, but there were a few in the ascending colon. They communicated with the lumen of the gut by a small constricted neck. Microscopically they were found to be composed of the normal coats of the colon. The mucosa and submucosa were infiltrated with leukocytes and showed a moderate amount of chronic inflammation.

Protozoa in the Digestive Tube of Man.—Cohnheim² (Berlin) discusses the role played by such protozoa as *Trichomonas hominis*, *Megastoma entericum*, and *Pagiomonas hominis* in the human economy. He inclines to the view that they are inoffensive commensals, and points to the fact that these protozoa are capable of living in the fluids of the gastrointestinal tract only when these fluids are alkaline in reaction, and they appear in the stomach and esophagus only when the fluids of these cavities have become abnormally alkaline in consequence of cancerous disease. These organisms, therefore, possess an important diagnostic value when found in the fluids of the upper portion of the alimentary tract.

Idiopathic Congestion of the Liver (Closure of the Hepatic Vein).—M. Penkert³ (Greifswald) reports the case of a boy 22 months old who presented the picture of a hepatic tumor. The ascites was drained several times and a Tisma operation performed, but without success. The autopsy revealed a very large liver produced by almost complete occlusion of the hepatic veins. The inferior vena cava when opened showed but few vessels terminating in it. Neither the left nor the right hepatic veins were well developed, and upon close examination of their lumen an obstruction in the form of an organized thrombus was found. Instead of other vein mouths, little depressions were seen in the vena cava. The liver presented the picture of exquisite stasis, overdistended veins and capillaries, atrophy of hepatic and biliary structures, proliferation of periportal connective tissue with increase of bile-vessels. The condition was evidently a congenital anomaly and life was preserved as long as it was through the collateral paths: the patulous umbilical veins and the right and left coronary veins.

Multiple Anemic Infarcts of the Liver.—F. A. Baldwin⁴ (Ann Arbor) reports an interesting case of multiple anemic infarcts of the liver occurring in a male subject dead of chronic valvular disease of the heart. Undoubted infarcts were present in other organs, such as the brain, heart, lungs, spleen, and kidneys. The conditions for infarction were most favorable, the heart being weak and the flow of blood consequently slow. The appearances of the areas in the liver were those of infarcts, the outlines of all the structures were preserved, but no

¹ Med. Rec., Aug. 9, 1902.

² Verhandl. des Vereins f. inn. Med., Berlin, July 12, 1902.

³ Virchow's Archiv, 1902, clxix, 337.

⁴ Jour. Med. Research, 1902, viii, 431.

nuclei would stain. The branches of the hepatic artery supplying these areas with blood were completely blocked by thrombi, the leukocytes of which had lost their chromatin and the red cells their hemoglobin; and surrounding the whole area was a zone of old red blood-cells and a beginning organization. Anemic infarcts occur in the liver but rarely, and then only when the organ labors under such disadvantages that it cannot overcome the results of an embolism or thrombosis in its congested hepatic vessels.

Experimental Liver Necrosis.—C. H. Boxmeyer¹ (Boston) gives the results of his study of the necroses occurring in the livers of experimental animals after inoculation with hog-cholera bacilli. Two sorts of lesions were present. One was due to the plugging of the capillaries by large mononuclear cells, and probably, also, to the direct action of a toxin upon the liver-cells. The other was due to the plugging of the smaller veins and capillaries by hyaline thrombi. Early in the disease there was a marked proliferation of the endothelial cells of the blood-vessels and lymph-vessels and serous surfaces. This proliferation was especially active in the lymph-spaces of the spleen. The cells produced had but a low vitality and possessed to a certain degree phagocytic powers. The hyaline thrombi were composed of slightly altered and coalesced erythrocytes. No direct relation of the bacteria to the lesions could be shown.

The Liver in Acute Yellow Atrophy of the Liver.—A. E. Taylor² (San Francisco), in the liver of a case of acute yellow atrophy, found the loss of substance disproportionate to the reduction in the total weight; that is, the liver was hydremic. The nitrogen was proportionate to the dried residue. The organ contained no glycogen and no hexon bases, but did contain albumoses and notable quantities of leucin and asparagine acid, the products of hydrolysis of protein. The fat, which was not altered in quantity from the normal, contained an excess of free fatty acids and of oxyacids and alcohols. Taylor believes that acute yellow atrophy of the liver should not be classed as a fatty degeneration, and that the process is a necrosis, according to all analogy, of bacterial or enzymic origin, and not associated with the formation or accumulation of fat in the liver.

The Liver in Pernicious Anemia.—Bret and Cade³ (Lyons) have examined the liver in 3 cases of primary progressive pernicious anemia and have found the same pathologic changes in all. Exudation from the blood capillaries, most marked at the center of the lobule, was seen to have occurred in each case. It was accompanied by changes in the cells resulting in necrosis. Around the capillaries were small connective-tissue fibers, indicating an early stage of cirrhosis. The centrolobular atrophy was apparently due to subhepatic venous congestion. In 2 of the livers there was no fatty change observable, and in the third the quantity of fat was very small. The occurrence of iron granules was very constant, being especially noticeable at the periphery of the lobule around the

¹ Jour. Med. Research, 1903, ix, 146.

² Jour. Med. Research, 1902, viii, 424

³ Lyon Méd., Oct. 5, 1902.

portal spaces. The liver in all 3 cases was larger and heavier than normal, but there was no definite proof of abnormal proliferative activity. The interstitial changes consisted of infiltration of leukocytes into the portal spaces and larger Glissonian trabeculas. These lesions were obviously inflammatory. It was not constant and was probably caused by toxic intestinal infection. In 2 of the cases the authors found small ulcers in the intestine. They conclude that the interstitial changes certainly, and the parenchymatous changes probably, are purely secondary, and that it is not possible to attribute to the liver any part in the genesis of primary pernicious anemia.

Cavernoma of the Liver.—Earl¹ (Dublin) reports a case of multiple cavernomas of the liver. They varied in size, were not raised above the surface of the organ when they abutted on it, and were also found in its substance. The larger tumors were surrounded by a fibrous capsule; the smaller merged into the liver-substance without any capsule. They were merely substitutions of the liver-tissue, and are attributable to dilation of lobular capillaries with subsequent pressure atrophy.

An Unusually Large Angioma of the Liver.—A. Mantle² (Halifax) reports the case of a patient who, on account of gradual increase of the abdomen and other signs pointing to abdominal tumor, was operated on, dying 2 hours after the operation with signs of internal hemorrhage. At the operation the tumor was seen to be continuous with the liver and bled very freely. At the autopsy the right lobe of the liver was found to be occupied by a large cavernous angioma. It was a flattened disc-shaped mass extending below the gallbladder, and measured 12 inches vertically and 6½ inches transversely. On section the growth presented the spongy appearance characteristic of cavernous angioma; the adjacent portion of the liver showed dilatation of the vessels. Microscopically the growth was composed of irregular spaces lined by endothelium separated by septums of dense fibrous tissue.

Adenoma of the Liver.—Earl³ (Dublin) reports a case of adenoma of the liver. The tumors were multiple, small and round, well marked off, and greenish in color. The largest was about ½ inch in diameter. The cells in them bore a close resemblance to liver-cells. They were divided into lobules, and were surrounded by a fibrous capsule. Sections of some of the smaller tumors showed a more marked resemblance to normal liver structure.

Abscess of the Liver Following Typhoid Fever.—J. G. Sheldon⁴ (Telluride) reports a case of fatal multiple abscesses of the liver in the course of typhoid fever.

Bacteria Found in Liver Abscess.—C. Davidsohn⁵ has investigated liver abscesses from the standpoint of their bacterial contents and has found that liver abscesses originating along the biliary passages have *Bacterium coli* in the pus; if along the circulatory stream the various pyogenic cocci are present. The colon abscesses usually result from gall-

¹ Brit. Med. Jour., Jan. 3, 1903.

² Brit. Med. Jour., Feb. 14, 1903.

³ Brit. Med. Jour., Jan. 3, 1903.

⁴ Am. Jour. Med. Sci., 1903, cxxv, 618.

⁵ Virchow's Archiv, 1903, clxxi, 369.

stones; the coccal abscesses have no one single cause. Sterile pus is not found in liver abscess after death. *Bacterium coli* is not found in all. The colon bacilli migrate into the liver after death, and even into liver abscesses which antemortem contained no bacteria.

The Pathology of Primary and Secondary Carcinoma of the Biliary Passages.—F. Miodowski¹ (Breslau) reports 4 cases of primary carcinoma of the ductus choledochus. All the patients died of cholemia. The pancreas was infiltrated secondarily in 3 cases; the duodenum in 1. In all the cases the tumor occluded the duct. He also reports a case of primary carcinoma of the cecum which through its metastases simulated carcinoma of the biliary passages; also a case of carcinoma of the liver remarkable on account of its huge size.

Hemochromatosis and Diabetes Mellitus.—J. M. Beattie² (Edinburgh) believes that the condition known as hemochromatosis is a distinct entity, and the diabetes associated with it is but a late manifestation, due to a very considerable destruction of the cells of the pancreas and an increase of fibrous tissue. The degeneration of the islands of Langerhans may have a very important role in the production of the diabetes. The degeneration of the cells of the liver, pancreas, and other organs, and the cirrhosis are in part due to a toxic agent possibly derived from the intestine by way of the portal circulation. The pigmentation is due partly to the degenerated cells not being able to perform their metabolic processes properly, and partly to transportation from the liver and pancreas. The cirrhosis is mainly due to the toxic agent causing the cell-degeneration; but one must admit that it may be due, in part, to the irritation caused by the pigment.

A case of pigmented atrophy of the mucous membrane of the small intestine of malarial origin is described by Rogers.³

Relation of Changes in the Pancreas to Diabetes.—A. Weichselbaum and E. Stangl⁴ (Vienna) have studied the pancreas in 17 cases of diabetes. In 15 the islands of Langerhans were diminished in number and size and presented constant, definite, and unmistakable changes. They were: (a) simple atrophy; (b) vacuolization or liquefaction; (c) increase in connective tissue. In 3 cases hemorrhage into the islands was noted; in 2, marked deposition of fat granules, especially limited to the islands. The authors discuss their observations at some length and conclude that the theory of Langerhans' islands being concerned in the metabolism of the carbohydrates, and that pancreatic diabetes may be caused through a disease of these islands, is based upon good grounds. Their reasons for this are the following: (1) All cases of pancreatic diabetes have constant definite changes in the islands, which are sufficient to impair or destroy their function; these changes are never found in nondiabetics. Nondiabetic atrophy of the pancreas is associated with a thinning of the epithelium, but not with liquefaction, destruction, or diminution in the number of the islands. (2) All authors have found these changes in all or in a majority of their

¹ Virchow's Archiv, 1902, clxix, 117.

² Jour. Path. and Bact., 1903, ix, 111.

³ Jour. Path. and Bact., 1903, ix, 117.

⁴ Wien. klin. Woch., 1902, xv, 969.

cases. (3) The remainder of the pancreatic tissue shows but slight changes or none. (4) Cases of glycosuria not showing insular changes can usually be explained in a manner reconcilable with the Langerhans island theory. (5) The development and histology of the islands make it probable that they have an entirely different function from the remainder of the pancreas.

A case of simple adenoma of the pancreas arising from an island of Langerhans is reported by A. G. Nicholls¹ (Montreal), who also reviews the literature.

Chronic Interstitial Pancreatitis with Involvement of the Islands of Langerhans in a Diabetic.—J. D. Steele² (Philadelphia) found the following lesions in the body of a diabetic: Tuberculosis of the right pulmonary apex; atheroma of the mitral and aortic leaflets; fatty degeneration of the myocardium; general arteriocapillary fibrosis; chronic interstitial nephritis and hepatitis; atrophic gastritis and gasterctasia; chronic interstitial pancreatitis. Microscopic examination showed increase in the connective tissue of the pancreas, and atrophy and degeneration of many of the pancreatic cells. The islands of Langerhans were diminished in number and size, and invaded by connective tissue.

The Pancreas in Cirrhosis of the Liver.—F. Steinhaus³ (Cologne) reports concerning the pancreas in 12 cases of cirrhosis of the liver. Eleven showed a distinct inflammatory proliferation of the interstitial connective tissue, associated with destruction of the parenchymatous cells. There was also proliferation of the bloodvessels and excretory ducts, just as is found in the liver in interstitial hepatitis. The islands of Langerhans were unchanged in 11 cases. This goes to show that the diminished tolerance for sugar frequently observed in cases of cirrhosis of the liver must be due to alteration in the pancreas, and that when cases of hepatic cirrhosis are not associated with glycosuria, the pancreas contains sufficient normally functioning structures to prevent diabetes. The glycosuria of cirrhosis of the liver and that of pancreatic and arteriosclerotic diabetes are thus shown to have a common origin. All are due to functional disturbance of the pancreas. It is probable, therefore, that this organ alone directs the function of sugar-consumption in the metabolism of the organism. Klippel and Lefas⁴ (Paris) have studied 8 cases of cirrhosis of the liver, and have found in all of these cases a greater or less degree of pancreatic sclerosis. As in some of the cases it was present in some parts of the pancreas to the exclusion of others, negative findings prove nothing unless a large number of sections is examined. Histologically the pancreas may present a perilobular or intralobular hyperplasia of connective tissue; or the hyperplasia may be most marked about the acini. The most frequent form of hyperplasia is the intralobular, the gland being divided by fibrous plaques into groups of from 10 to 20 acini. Associated with this marked intralobular growth is usually an increase of connective tissue surrounding the individual

¹ Jour. Med. Research, 1902, viii, 385.

² Deut. Arch. f. klin. Med., lxxiv, 537.

³ Am. Jour. Med. Sci., 1902, cxxiv, 71.

⁴ Rev. de Méd., Jan. 10, 1903.

acini; interlobular changes may be present in addition to the other forms. While the initial changes are probably located about the ducts, it is rare to discover marked degrees of connective-tissue growth in these localities. The islands of Langerhans are more resistant than other parts of the pancreas, but they too may present a thickening of their trabeculas. The cellular or parenchymatous lesions which occur are: (1) Hypertrophy of acini, with enlargement of nuclei and enhanced staining reaction; (2) deorientation of cells within certain acini; (3) granular degeneration; (4) fatty degeneration. The changes in the pancreas do not follow a parallel course with those occurring in the liver and spleen. In most cases the sclerosis of the liver is more advanced, but this relation may in some cases be reversed. In every case the newly formed connective tissue in the pancreas is of the adult type, very poor in nuclei, while in the liver a younger type of connective tissue is not infrequently found. In most cases the term cirrhosis of the liver can be used with propriety as referring to the most important pathologic and clinical localization; however, the pancreas may be altered as much as or more than the liver in some cases, and the pancreatic lesions cannot be considered as the mere effect of the hepatic disease. In fact, alcohol, the common cause of the disease under consideration, acts simultaneously on the liver, the spleen, the pancreas, and the alimentary canal.

Pancreatic Lithiasis.—F. P. Kinnicutt¹ (New York) reports a case in which a number of pancreatic calculi were passed at different times. They were made up of carbonate and phosphate of calcium, indicating their pancreatic origin. One stone passed somewhat later consisted of cholesterol and other organic and mineral material. As an attack of jaundice existed, this stone was probably a biliary calculus.

THE URINARY SYSTEM.

The Pathogenesis of the Uremic State.—H. Stern² (New York) believes that the uremic state depends upon diminished electrical conductivity of the blood-serum, or, at least, that insufficient serum conductivity is a potent contributing factor toward its production. His findings and conclusions are as follows: The retained products of metabolism are in themselves toxic. In uremic serum there occurs invariably an abnormally large amount of retained nitrogen. There is also a higher molecular concentration of the blood-serum, which is due to the accumulation of the normal products of catabolism. This is evidenced by determination of the freezing-point, which in uremic blood-serums is depressed to between —0.61° and —0.67° C. The convulsions originate in the psychomotor centers of the cortex cerebri; the hyperosmotic condition of the blood and liquids in the brain may occasionally produce the attack, but there is no analogy between the degree of molecular concentration and the intensity of the process, or between the degree of freezing-point depression and the amount of retained nitrogen. In uremia the retained albuminous derivatives are to a great degree nonelec-

¹ Am. Jour. Med. Sci., 1902, cxxiv, 948.

² Med. Rec., Jan. 24, 1903.

trolytic. This interferes with ionization and retards ionic movement, lessening electric conductivity of the watery liquid in which the electrolytes are contained. The ions participate in augmenting osmotic tension and in depressing the freezing-point; the excessive osmotic pressure of uremic serum is due to its neutral molecules. Determination of the freezing-point discloses high molecular concentration, but not the degree of electric conductivity. Dissociation of electrolyte molecules occurs in the ratio of the dilution of the watery solution. Intravenous injection of water dilutes the serum so that it exhibits greater conductive properties. Conductivity is more readily established in uremia from parenchymatous than from interstitial nephritis, on account of smaller amounts of retained nitrogen. The reduction of the temperature in uremia contributes toward the reduction of conductivity. Elevation of temperature, on the other hand, so long as within well-defined limits, tends to increase the conductivity.

The Influence of Nephrectomy upon Absorption.—S. J. Meltzer and William Salant¹ (New York), from an experimental study of the influence of nephrectomy upon absorption, conclude that the removal of the kidneys, instead of decreasing rather increases the absorption of fluid from the tissues into the circulation, which is apparently due to an increase in the osmotic pressure of the blood-serum. This increase continues in full force for at least 24 hours, and lasts probably a good deal longer, although with a gradually diminishing intensity. In the studies of the factors concerned in the development of edema, experiments with double nephrectomy are therefore apparently of very little assistance. The animal does not survive long enough to reach a period in which absorption might be diminished, while in the period following immediately after nephrectomy the increased absorption will directly prevent the formation of edema. The latter fact explains in a simple way the well-known experience that no edema appears directly after double nephrectomy, an experience which has always been a puzzle to many investigators; and it also renders clear the absence of edema in prolonged cases of anuria either of hysterical or reflex origin, or due to a simultaneous impaction of calculi in both ureters or by the invasion of neoplasms, as mentioned by Cohnheim and others. The first effect of anuria is not an increase of lymph in the tissues, but rather an increase of its absorption from the tissues into the circulation, thereby preventing the formation of edema.

Origin of Urine Albumin.—L. Aschoff² (Göttingen) injected animals with animal and human kidney substance, to note if the blood-serum of these animals would precipitate albumin in urine. His results were negative, confirming Werten's experiments, who found that the albumin present in nephritic urine is derived from the blood and is different from the specific kidney albumins. According to these results, a difference, therefore, exists between the blood-serum albumin and the kidney-epithelium albumin.

Disturbance in the Regeneration of Renal Epithelium.—R.

¹ Jour. Med. Research, 1903, ix, 33.

² Lancet, Sept. 6, 1902.

Roessle¹ (Kiel) reports a case of chronic parenchymatous and interstitial nephritis, in which the kidney contained many giant-cells in the hyperemic tissue surrounding a peripheral infarct, and about areas of necrosis. Even the convoluted tubule contained giant-cells with from 8 to 16 nuclei; they were found in branches of the tunica propria. The protoplasm of these giant-cells stained more intensely with eosin than the protoplasm of normal epithelial cells. The abnormal cells were certainly derived from the preexisting epithelium. Their origin in those parts of the kidney showing a simple parenchymatous nephritis is attributed to faulty regeneration. The formation of giant-cells about the infarct Roessle explains by quoting an experiment of Hertwig, who found that injury to the protoplasm of sea-urchins is followed by a division of their nuclei. Infarction produces a transverse splitting of the epithelial cells of the parts affected. The internal granular portion of the protoplasm is destroyed and the external lighter portion with the nucleus is preserved. In the epithelial cells so altered an increase in the number of nuclei occurs. The new nuclei are usually darker and smaller.

Cystic Degeneration of Both Kidneys.—I. N. Danforth² (Chicago) reports a case in which during life a diagnosis of cystic tumors of the kidneys had been made. The patient for many years was very robust to all appearances in spite of the fact that large reniform tumors were present. He died with symptoms of uremia. The kidneys were found enormously enlarged, weighing together 13 pounds. They had undergone complete cystic degeneration, not a trace of normal tissue being discernible. The cysts varied in size from that of a pea to that of a hen's egg; the walls were thin and translucent; they were filled with a watery fluid, which was somewhat cloudy, but a few of the cysts contained blood. An examination of the fluid showed a few round-cells like leukocytes, crystals of cholesterol, and granular debris.

Destruction and Hyaline Degeneration of the Malpighian Bodies of the Kidney.—Th. Tschistowitsch³ (St. Petersburg) finds that the destruction of the malpighian bodies in nephritis may be of 3 types: (1) Subacute and chronic glomerulonephritis is preceded by epithelial proliferation and secondarily presents proliferation of the connective tissue. (a) The connective tissue breaks through the capsule of the glomerulus and destroys it; synechias occur between glomerulus and capsule; cystic spaces form and lead to destruction of the malpighian body. (b) In disturbances of the circulation and the urinary excretion the inflammation is but slight. The membrana propria swells and must be considered the only source of the capsule hyalin; the glomeruli collapse, changing also into hyaline material. The hyaline degeneration spreads to the basement membrane of the uriniferous tubules. (c) In chronic interstitial nephritis the connective tissue in Bowman's capsule increases and compresses the malpighian bodies. The hyaline degeneration begins in the basement membrane and spreads from there to the entire capsule. The glomeruli degenerate also, but their hyalin differs from the

¹ Virchow's Archiv, 1902, clxx, 375.

² Amer. Med., July 5, 1902.

³ Virchow's Archiv, 1903, clxxi, 243.

capsular hyalin by its fine granules and its orange color, when van Gieson's stain is used. (2) The chief source of the hyalin, while the destructive process of the malpighian bodies is going on, lies in the swollen capsular membrana propria and the walls of the glomerular vessels. (3) The newly formed fibrous tissue does not grow through the thickened and degenerated membrana propria into the malpighian bodies; occasionally the fibrillas grow along the vessels into the glomeruli. (4) The presence of the nuclei of fibroblasts within the capsule is proved in the first type of degeneration; they are thought to be present in the third also. In the second type, and in many cases of the third also, the nuclei present probably belong to uninuclear and multinuclear leukocytes.

The Fat of Renal Infarcts: A Contribution to the Question of Fatty Degeneration.—F. Fischler¹ (Heidelberg) performed a large number of experiments with rabbits to determine whether or not fat is formed in organs separated from the circulatory stream, if no infection occurs. The experiments lead the author to the following conclusions: In fatty infiltration as well as fatty degeneration the presence of demonstrable fat is due to an imperfect circulation,—whether of blood or lymph, or diffusion-circulation,—as the fat occurs only in places where such deficient circulation exists. The cell must be alive. Under aseptic precautions dead cells do not undergo fatty degeneration, but cells showing some injury to their composition do. Development of fat from cell-albumin is not demonstrated by these experiments.

Bilateral Duplication of the Ureters.—A. H. Gould² (Boston) reports 2 cases.

Etiology and Pathology of Prostatic Enlargement.—L. R. G. Crandon³ (Boston) considers the senile vesical insufficiency commonly referred to as "prostatism" to be not a single entity, but a complex condition for which the following factors are responsible: (1) atrophy of the bladder-muscle and newgrowth of connective tissue finally infiltrating the muscle; (2) mechanical obstruction at the beginning of the urethra, which may simply be a posterior lip in front of a retroprostatic pouch, a true middle lobe, or an enlargement of one or both lateral lobes protruding into the urethra. Chronic cystitis and stone in the bladder intensify these two causes. Obstruction is more important than the atrophy of bladder-muscle. The most marked cases are those with combined atrophy, connective-tissue infiltration, enlarged prostate, and chronic cystitis. Fatty changes in the bladder-muscle and arteriosclerosis of the vessels play no part in the condition. True prostatic enlargement is due to a chronic inflammatory condition occurring in the deepest portions of the prostate, midway between the periphery and the urethra. At this point are found new connective tissue and contracted scar-tissue about the principal excretory canals of the gland. This contracting tissue compresses and occludes the lumens; the contained secretion cannot escape, and by its accumulation causes peripheral dilation of the gland tubules. The peripheral dilation is more rapid and more marked the nearer

¹ Virchow's Archiv, 1902, clxx, 100.

² Am. Jour. Med. Sci., 1903, cxxv, 428.

³ Ann. of Surg., Dec., 1902.

to the exit the obstruction occurs. This dilation is the essential factor in producing the increase in the size of the gland; the newly formed connective tissue is unimportant and the participation of muscle-tissue (myoma) doubtful. Atrophy of the prostate results when the new-formation of connective tissue occurs at the periphery of the gland and compresses the blind ends of the tubules, the atrophy of which, combined with shrinking of the stroma, leads to the small prostate. As a result of his observations, Crandon concludes that the underlying cause of the usual form of prostatic enlargement (and of certain forms of atrophy) is the slow formation of a new connective tissue due to infection or to infection aggravating a senile degenerative process. The gonococcus is probably the most common specific infection because (*a*) of its frequency; (*b*) other inflammatory conditions are not common in this region; and (*c*) a great similarity exists between the histology of the gonorrhreal process and that of the senile prostate. Neoplasms, fibromyomas, and adenomas occur, but may be called rare.

THE NERVOUS SYSTEM.

Vascular and Glia Changes in Relation to Neuron Degeneration.

—F. W. Mott¹ (London) describes the changes occurring in the vessels of patients suffering with general paralysis of the insane. There is an apparent increased vascularity in such cases, this being due to the staining of cells accumulated in the perivascular spaces. These cells, first described by Unna, are called "plasmacytes," and their presence is by some considered pathognomonic of general paralysis of the insane. The origin of these cells is doubtful. They might arise from the endothelium of the vessels or from the cells lining the perivascular lymphatics. In Congo sickness or in leukemia the vessels are also occluded, but there is little change in the nerve-cell. In animals in which all the vessels passing to the brain have been ligatured there is no cell-proliferation around the vessels.

Myasthenia Gravis.—C. S. Myers² believing that myasthenia gravis results from the action of some autogenetic poison, states that, whatever be its source, whether or not it arise from interference with internal secretion, it is probable that in the end the nerve-endings are mainly affected. Before this stage has been reached, however, the nerve-cells of the motor nuclei may for some reason have lost control over the nutrition of the nerve-endings. It is likely that the lesions are usually symmetric, because the bilateral nuclei at any level of the brain and cord are simultaneously affected by the poison, and thus expose the end-plates of each side to its action. From this partial injury a general destruction of the entire neuron may follow, if the disease progress long enough. In many cases, however, no lesion has been found after death; in some a fragmentation and diffuse arrangement of the Nissl granules of the motor nuclei; in one or two rare cases the nerve-fibers have begun to degenerate, and muscular atrophy may then conceivably have set in.

¹ Lancet, Nov. 22, 1902.

² Jour. Path. and Bact., 1903, viii, 306.

Usually, however, sufficient vitality still remains in the neuron to keep it and its muscle-fiber from actual death; while the metabolic disturbance of exhaustibility of the neuromuscular system increases and extends, until the embarrassment of respiratory movements finally brings about a fatal issue.

Actinomycosis of the Central Nervous System.—W. T. Howard, Jr.¹ (Cleveland), reporting a case of actinomycosis of the central nervous system, due to an unidentified member of the actinomyces group, reviews the literature, and states that actinomycosis of the central nervous system is rare, there being only 5 primary and 13 secondary cases on record. The disease usually affects males in the prime of life; in the primary cases the age being given as 24, 26, and 52 years, respectively, in 3 cases; not mentioned in 2 cases. In the secondary group, 2 were 16, 5 between 30 and 40, 1 was 43, and 1 was 52 years; age not mentioned in 4. Two cases occurred in females. Of the primary, 3 were reported as instances of "streptothrix" infection, and only 1 (Bollinger) was regarded as typical actinomycosis. Of the 13 surely secondary cases, 8 were regarded as typical actinomycosis, 2 as probable actinomyosis, 2 as eladothrix infection, and 1 as streptothrix infection. All of the primary cases except 1 were acute, while of the secondary in at least 10 the lesions of the nervous system were recent, and usually the cause of death. The organisms were cultivated in 2 primary and in 2 secondary cases, in one of which aerobic and in the other anaerobic growths were obtained. In most of the cases neither cultures nor animal experiments were made, the diagnosis being based on the microscopic examination alone. No mention is made of any attempts to test the acid-resisting powers of any of the organisms found. The so-called actinomycotic granules were recognized in the pus of several cases. In one, instead of abscesses, there were multiple nodular masses in the brain, and in Bollinger's case there was a firm mass the size of a hazelnut in the third ventricle and in the foramen of Monro. Primary lesions of the lungs and bronchial glands were the most common sources of the metastatic lesions of the central nervous system. In one case the actinomycotic process extended directly through the skull to the meninges and brain. It seems established that, in the present state of our knowledge, all processes caused by microorganisms having a mycelium of branching, interlacing, and sometimes radiating threads are to be considered as actinomycosis, and that organisms with the above characteristics, whether or not they form "drusen" and clubbed hyphas in the tissues, are to be regarded as actinomycetes. Further knowledge is necessary before a satisfactory classification of the actinomycetes and the processes caused by them is possible. To class tuberculosis under actinomycosis is of doubtful value. It is well to recall, however, that there are two broad divisions of the genus *Actinomyces* as used by Abbott and others, the acid-resisting (*B. tuberculosis* and the acid-resisting bacilli, so-called) and the nonacid-resisting or acid-bleaching, and that typical tuberculosis is always caused by the prominent member of the former and typical actinomycosis by the

¹ Jour. Med. Research, 1903, ix, 301.

prominent member of the latter group. It is better, with Lehmann and Neumann, to use the term "actinomycetes" for the large number of organisms of the latter group. This acid-bleaching group is apparently a large one, and our knowledge concerning it is best summarized in Silberschmidt's conclusions. The organism of the case reported belongs to the branch of this group in which club-formation is inconstant or absent, pathogenesis for animals is marked, and cultures on artificial mediums negative.

Pathologic Changes Met in Erythromelalgia.—H. B. Shaw¹ (London) in 3 cases of erythromelalgia found as the principal change a thickening of the intima of the arteries; venous thrombosis or a great proliferation of the inner coat of the veins was also noted. No example of a sclerosed nerve-fiber was found, and only in 2 or 3 limited series of sections was an osmic-acid effect produced pointing to changes in the nerves; probably the effects were artificial and not pathologic.

Changes in the Nervous System in Lead-poisoning.—W. G. Spiller² (Philadelphia), from a study of the pathologic changes in the nervous system in a case of lead-poisoning, and a review of the literature, concludes that lead affects the brain and its pia, the nerve-cells of the anterior horns of the spinal cord, the ganglia on the posterior roots, the peripheral nerve-fibers, and the muscles. It seems to be impossible to determine whether its effects are first manifested in alteration of the peripheral motor fibers or of the motor cell-bodies of the spinal cord; but inasmuch as both peripheral motor fibers and motor nerve cell-bodies are sooner or later affected, this question is not very important. The significance of the proliferation of the endothelial cells of the capsules in the spinal ganglia and on the cerebral pia is difficult to determine.

The Pathology of Polioencephalitis Inferior.—F. E. Batten³ (London) reports a case of polioencephalitis inferior affecting the nucleus of the right seventh nerve. The brain showed acute congestion most marked in the region of the right seventh nucleus, with thrombosis of the finer vessels, hemorrhage, and exudation of small round-cells, with complete destruction of the cells of the nucleus. The sixth nucleus of either side and the seventh nucleus of the left side showed slight engorgement of the vessels. There were considerable perivascular engorgement and some exudation of round-cells in the medulla in the region of the ninth, tenth, eleventh, and twelfth nuclei, more marked on the right side than on the left. The lesion was of vascular origin and corresponded in appearance with that found in acute anterior poliomyelitic and acute polioencephalitis superior.

Cholesteatoma of the Brain.—H. M. Fletcher⁴ (London) reports a case. The tumor, which was of the size of a small walnut, was situated in or beneath the velum interpositum, behind and compressing the pineal gland. It was hard and had a pearly luster. In the majority of cases hitherto described the tumor had been found at the base of the brain. Cholesteatoma is usually regarded as a proliferation of the endothelial

¹ Lancet, Nov. 22, 1902.

³ Lancet, Oct. 25, 1902.

² Jour. Med. Research, 1903, x, 142.

⁴ Lancet, Jan. 10, 1903.

cells lining the subarachnoid trabeculas, but the author is inclined to look upon them as allied to dermoid cysts.

Partial Internal Hydrocephalus.—W. G. Spiller¹ (Philadelphia) reports 2 cases of partial internal hydrocephalus from closure of the interventricular passages. In the first case the right cerebral hemisphere was a mere sac, while the left was normal. Although the lesion was unilateral, bilateral contracture was very intense—a very uncommon condition. The hydrocephalus was the result of a partial closure of the right foramen of Monro from inflammatory changes about this foramen, and the condition must have been congenital or have developed early in life, as shown especially by arrest of development of the upper limb. The cause of these inflammatory changes and proliferation of neuroglia at the foramen of Monro is unknown, but possibly it may have been the result of tuberculosis. In the second case the internal hydrocephalus was the result of closure of the aqueduct of Sylvius by proliferation of the neuroglia, and caused the symptoms of cerebellar tumor. The ventricles, except the fourth, were much dilated, the fourth being of normal size. It is suggested that when a tumor of the cerebellum is suspected, the possibility of internal hydrocephalus should be borne in mind.

MISCELLANEOUS.

Fatty Degeneration.—A. E. Taylor² (San Francisco) gives a critical discussion of the entire question of fatty degeneration and the results of certain experiments undertaken with a view to determine the chemistry of the process. His experimental investigations showed that in the course of fatty degeneration combined fat is set free in notable amount, a normal metabolic relation being dissociated. The hypothesis is warranted that the fat appears as an abnormal morphologic constituent in the tissue in fatty degeneration. Upon the basis of this hypothesis the combined fat may be considered a metabolic constituent of the protoplasm. During the course of the disease determining the fatty degeneration this combination is severed after the manner of action of ferment, the previously combined fat is set free, becomes chemically and morphologically free fat, becomes available to our technical procedures, and appears as fatty granules in the protoplasm of the cells involved. Thus viewed, the initial chemic change in the cells with fatty degeneration is a sort of proteolysis, whereby the fat in combination with protoplasmic protein is set free from that combination; and the characteristic fatty appearance of the protoplasm in the early stages of fatty degeneration is due to this metabolic fat set free within the protoplasm. Following this comes fat transportation and infiltration of the affected cells, with the production of the fully developed lesions; though why such a fatty infiltration should occur, even as a passive process, we do not understand. Viewed in the light of this hypothesis, fatty degeneration is a purely disintegrating process, some of the features of which resemble digestion (using the word

¹ Am. Jour. Med. Sci., exxiv, 44, 1902.

² Jour. Med. Research, 1903, ix, 59.

in the broad sense of enzymic action, a better term being autolysis). How extensive this disintegration may be is illustrated by the experiment reported by Taylor, in which two-thirds of the entire fat-protein combinations of the body were disintegrated.

The Occurrence of Glycogen under Pathologic Conditions.—F. Katsurada¹ (Freiburg) inserted pieces of sterile elder-pith beneath the skin of animals and then tested the cells which migrated into the plates for their content of glycogen by means of iodoglycerin. The normal leukocytes contain little or no glycogen, as proved by examination of leukocytes from bone-marrow and blood; after 5 hours a distinct glycogenic reaction can be obtained. After some days the leukocytes degenerate and the glycogen is found outside the cells. Leukocytes continue to migrate into the elder-pith and follow the same cycle. In chickens the cycle lasted 22 hours, in rabbits 4 days, in dogs 5 days. Formoblasts and their derivatives, giant-cells, were also found to contain glycogen after being in the elder-pith for some time. This for both classes of cells is probably due to insufficient nourishment after they enter the pith, and the author sees in the presence of glycogen in cells a sign of degeneration of these cells, and considers the term "glycogenic degeneration and glycogenic deposits" perfectly proper in the same sense as "fatty degeneration and fatty deposits."

Adiposis Dolorosa.—F. X. Dereum and D. J. McCarthy² (Philadelphia) found the following conditions at autopsy in a case of adiposis dolorosa: Adenocarcinoma of the pituitary body; anomalous convolutions of the cerebral cortex; excessive fissuration and confluence of fissures; fibroid hemolymphoid nodules in the subcutaneous fat, in a state of congestion; interstitial neuritis of the nerve-filaments of the superficial fat; newly formed hemolymph glands in the subcutaneous fat; telangiectatic angioma, with slight interstitial hyperplasia of the spleen; defective development of the testicles; acute parenchymatous nephritis; cutaneous erysipelas.

Osteitis Deformans and Hyperostosis Cranii.—Morton Prince³ (Boston) describes 2 cases of the former and 1 of the latter. In all 3 the bony changes are similar: Irregular, enlarged cranium, thickened jaw and sternum, enlarged clavicles and thickened ribs, thickened and curved radii and distorted phalanges. The long bones of the lower extremities are thickened and curved. The third case mentioned was reported as a case of hyperostosis eranii in 1896, but since then has developed into a case of osteitis deformans. Prince's conclusions are: (1) We have no sure ground for differentiating hyperostosis cranii and osteitis deformans. (2) They are probably trophic disorders. (3) Various pathologic facts indicate that they are allied diseases, probably different manifestations of the same disorder. (4) The osteoarthritic changes in osteitis deformans are probably manifestations of the disease, and not complications. (5) The results of autopsies thus far made do not at all exclude the nervous system as the seat of the trophic derangement, but

¹ Ziegler's Beitr., 1902, xxii, 173.

² Am. Jour. Med. Sci., 1902, cxxiv, 994.

³ Am. Jour. Med. Sci., 1902, cxxiv, 796.

the changes that have been found in the spinal cord and peripheral nerves and analogy with other known lesions like those of tabes and syringomyelia suggest a neuropathic origin similar to that of the myopathies.

Pathology of the Muscular Tissue in Acute Primary Polymyositis.—P. Bacialli¹ (Bologna) reports a case of acute polymyositis in a man. From a piece of muscle pure cultures of *Staphylococcus albus* were obtained during life, also from the blood collected at the point of incision. The same organisms were obtained after death from the heart, liver, and muscle. The muscle showed marked edema, considerable increase in interstitial connective tissue, infiltration of leukocytes, and extravasation of blood. The changes in the muscle-fibers were of 3 kinds: (1) Considerable increase in the number of muscle-nuclei, the contractile substance preserving its ordinary structure; (2) slight increase in nuclei, the contractile substances, however, becoming somewhat homogeneous and extensively vacuolated; (3) diminution or disappearance of nuclei, the contractile substance showing complete degeneration into a homogeneous transparent mass similar to hyaline material. These alterations are due to an inflammation of the muscular tissue of varying degree from simple irritation to complete destruction of the contractile substance. The lesions are attributed to the toxins of *Staphylococcus albus*.

Chronic Cystic Mastitis.—R. B. Greenough and H. F. Hartwell² (Boston), from a study of 30 cases and a thorough review of the literature, reach the conclusion that the name of "chronic cystic mastitis" (Koenig) is the most satisfactory of the many terms used to describe the condition of fibrous tissue increase and cyst-formation in the female breast at the time of the menopause. The use of the term "mastitis" should not imply an inflammatory process due to bacterial infection, but rather an increase of fibrous tissue of other than local tumor origin. Increase of the fibrous tissue of the breast is the normal condition in the stage of decline of the gland at the time of the menopause. The formation of cysts and the proliferation of the epithelium of the cysts and acini are the striking features of the disease. Variations of the epithelium are found in this disease, from atrophic forms, through columnar cells, to papillary proliferation and cell-masses of an adenomatous type. The transition of adenomatous types of proliferation to carcinoma of the adenocarcinoma type occurs in a limited number of cases. Transition to other types of cancer was not observed. The danger of the transition of chronic cystic mastitis to adenocarcinoma is sufficient to make the removal of the entire gland advisable in all but very early and slight degrees of the affection.

Alloxur Bodies and the Pathology of Gout.—M. Kaufmann and L. Mohr³ have made extensive observations upon the metabolism of 5 individuals suffering from gout, and have noted that the excretion and retention of nitrogen in such patients are not always the same. Even when being overnourished, there are periods in which there is a ten-

¹ *Il Policlinico*, 1902, ix, 16.

² *Jour. Med. Research*, 1903, ix, 416.

³ *Deut. Arch. f. klin. Med.*, lxxiv, 584.

dency to considerable tissue-destruction, without particular relation, however, to the height of the attack or its gravity. In other cases excretion of considerable amounts of nitrogen may mean only removal of retained poisons, and this may occur at a time of very acute inflammation. A study of the metabolism of phosphoric acid in such patients sustains the conclusion that these two entirely different conditions (incorporation and breaking down on one side, retention and removal on the other side) may be associated in varying manners in different individuals and at different stages of the disease.

The Status of the Plasma-cell Question.—A. Pappenheim¹ (Hamburg) believes that: (1) Of the leukocytes in granulation tissue, only the multinuclear leukocytes are of hematogenic origin; all the other round-cells are derived from connective-tissue cells. (2) Of these histogenic granulation cells, two may be differentiated theoretically: the young fibroblast with vesicular nuclei and the leukocytoid round-cells; practically, they cannot be differentiated at all times. (3) Four types can be separated among the leukocytoid round-cells; they resemble the colorless blood-cells in every respect and can be separated only theoretically: (a) the large lymphocytoid young mother-cell; (b) the large leukocytoid achromophilic pseudoplasma cell; (c) the typical large plasma mother-cell; (d) the small lymphocytoid daughter plasma-cell. He considers tubercles entirely of histogenic and not of histo-hematogenic origin.

Experimental Fat-necrosis.—H. G. Wells² (Chicago), as the result of an experimental study, states that fat-necrosis seems to be merely a special form of necrosis of fat-tissue, differing from simple necrosis chiefly in the sharp limitation of the affected area, usually by a wall of leukocytes and later by connective tissue, and the filling of the necrosed cells by the products of fat-splitting. Each of these features can be produced experimentally in various ways, but the complete picture has never yet been produced except by the secretion of the pancreas. Fat-necrosis can be obtained with constancy in cats and dogs, less successfully in rabbits, by intraperitoneal injections of extracts of fresh hog pancreas, and nearly as well with dog pancreas. The results are the same with solutions made with weak alkalies, weak acids, or water. Fat-necrosis produced in this way is the same in appearance, both macroscopically and microscopically, as human fat-necrosis. Equally constant results can be obtained with ordinary commercial pancreatins. Preparations of *Carica papaya*, although highly irritating, do not produce fat-necrosis. This property of pancreatin to produce fat-necrosis survives heating for 5 minutes at a temperature as high as some point between 65° and 71° C.; above this point the property is entirely lost. The amount of fat-necrosis produced decreases steadily after exposure at 55° C. and upward. These observations point to enzyme action as the source of the condition. It has been impossible to ascertain which of the pancreatic enzymes causes fat-necrosis. Trypsin, weak in or devoid of lipase, will not produce this effect. Lipolytic ex-

¹ Virchow's Archiv, 372, clxix, 1902.

² Jour. Med. Research, 1903, iv, 70.

tracts of hog's liver or cat's serum are likewise inactive. Mixtures of lipolytic extracts of liver with pancreatic trypsin will not produce fat-necrosis. Extracts of fresh dog's pancreas that are feeble in or devoid of tryptic power, but possess lipolytic power, cause fat-necrosis. If to such extracts an emulsion of duodenal mucosa is added, the enterokinase greatly increasing the tryptic activity, no fat-necrosis will be produced. As the lipase of pancreatic extract cannot be isolated, it is impossible to ascertain if it by itself is capable of causing fat-necrosis; but it seems highly probable that it is essential. It may be that the lipase causes fat-splitting after some other ingredient of the pancreatic juice has injured the cell. When fat-tissue within the body has been made necrotic and preserved from outside influences of absorption, etc., the lipase that it may contain does not produce the changes of fat-necrosis. Simple alkaline solutions of the strength of pancreatic juice or slightly stronger do not produce fat-necrosis. Many of the features of fat-necrosis may be produced after death in animals, and also *in vitro*, with pancreatin, but the resulting condition does not resemble fat-necrosis closely. Dissemination outside the abdominal cavity has been observed as early as 12 hours after intraperitoneal injection. The route by which the spreading is accomplished is probably the lymphatic system. The earliest stage in fat-necrosis is a simple necrosis of the surface tissue, which extends gradually into the deeper fat-cells. Fat-splitting is subsequent to the necrosis and not its cause. At first the products are non-crystalline, but become so later. The process progresses for but a few hours at any one point, the extension seeming to be limited by surrounding leukocytes. Absorption of the area is accomplished by leukocytes, and healing by proliferation of connective tissue from the margins. Adhesions are seldom formed. The foci become visible to the naked eye in from 3 to 5 hours. They may disappear within 11 days, or persist for a much longer time, depending chiefly upon their size. Fat-necrosis by itself is not dangerous to the affected animal, and the animal may show no observable symptoms.

The Origin and Occurrence of Cells with Eosinophilic Granulations in Normal and Pathologic Tissues.—Howard and Perkins¹ state that in the routine examination of 825 specimens removed by operation, coarsely granular eosinophiles were found in the normal appendix in 10 cases, and in the normal fallopian tube in 1 case. These cells occurred in larger or smaller numbers in the tissues or bloodvessels, or both, in 108 cases, or in 13.09 %; 83.3 % of these lesions were infectious in origin. In 7 cases (1 adult and 6 children), 4 of which died of infectious processes, eosinophiles were present in apparently normal tissues. In 120 consecutive autopsies 27 cases showed larger or smaller numbers of eosinophiles in various organs the seat of pathologic changes. In this series they occurred in the spleen in chronic interstitial splenitis in 11 cases, in the thymus in 5, in lymph-glands in 3, in the stomach in 3, in the intestine in 2, in the kidney in 5, in the lungs in 3, in the liver in 3, in the heart in 1, in the skeletal muscles in trichinosis in 1 case. In

¹ Johns Hopkins Hosp. Reports, x, 249, 1902.

some cases the cells had been brought to the part by the blood; and in others they had been formed in the lesions, while in still other cases their presence was to be accounted for in both of these ways. In a large number of cases the development of coarsely granular eosinophiles could be traced from plasma cells and in some cases from hyaline leukocytes.

NERVOUS AND MENTAL DISEASES.

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SUMMARY.

THE past year has not been as productive in contributions to neurologic and psychiatric literature as usual. The subject of the tendon-reflex and other reflexes has attracted a very great deal of attention and study, and particular importance has been given to the varieties of the pupil-reflexes in the various organic and functional disorders of the nervous system. The value of Kernig's sign as diagnostic of actual disorder of the motor apparatus has been questioned somewhat, as it is found in other conditions, such as typhoid fever in children. Its value in children, however, has always been considered less certain than in the adult. Multiple neuritis and its relation to the central nervous system has been positively supported by a number of well-recorded instances in which both brain and spinal cord were found involved. Quite a number of communications have been made on the subject of neuromas, some of which are of very great value. Herpes zoster, even of the so-called labial and simple varieties, has been made the subject of important investigation, and its relation to disturbance of the posterior root ganglion seems to be well founded in all instances. The opinion seems to be growing that in locomotor ataxia inflammatory disturbance of the meninges is one of the initial steps in the involvement of the posterior roots and the posterior root zones. A number of important contributions to the casuistry of tumor of the spinal cord are to be noted. The subject of gas-cavities in the brain of antenortem and postmortem development has furnished a number of observations of great interest, and several contributions upon diseases at the base of the brain particularly involving the brain-stem, symptomatology, etc., have appeared during the year. A good deal of attention has been given to the cerebrospinal fluid in the various disorders, and the cytologic diagnosis of the underlying condition in some instances seems to be a possibility. Graves's disease receives its usual amount of attention. A variety of angioneurotic edema, denominated angioneurotic erythema, has also received careful description. The motor disorders variously designated among the myoclonias have been given several careful analytic studies. The subject of epilepsy has furnished a very large amount of material during the year. Distinct changes of the cortical cells are considered proved by some writers. A number of new symptoms present in epileptics and a number of epileptic equivalents new

to the literature of the subject have been adduced. The dietetic treatment of the disorder has also received continued support.

In the matter of mental diseases very little of importance has appeared during the year.

SYMPTOMATOLOGY AND SYMPTOMATIC DISORDERS.

Paradoxical Reaction of the Pupil for Accommodation.—W. G. Spiller¹ reports 3 cases in which there was **inverted reaction of the pupil upon accommodation**, similar to the inverted response of the pupil to light, which is occasionally encountered. These two forms of abnormal pupillary response are not necessarily present in the same person. The author knows of no other cases reported except those of W. Vysin as quoted by Piltz. Piltz believes that the paradoxical reaction in accommodation is observed only in functional cases, but the first case observed by Spiller was undoubtedly one of organic nervous disease. In making the test it is important to observe that the pupil be not directed upward, as in the upward turning of the eyeball a tendency to dilation of the normal pupil often takes place. The significance of this reaction is not yet evident.

Study of the Reflexes.—J. M. Bradley² describes and figures an instrument, which he calls the **reflexograph**, for the purpose of automatically measuring, timing, and charting the knee-jerks and other tendon-reflexes, including ankle-clonus and the Babinski sign. By means of this instrument it is found that there are composite modifications of the reflexes in various diseases, showing changes in these phenomena which when deciphered are likely to add to the keenness of diagnostic possibilities.

G. L. Walton and W. E. Paul³ have made a careful study of the **Achilles jerk** and the response which occurs on **tapping the shin**. They conclude: (1) The Achilles jerk is practically as constant in health as the knee-jerk. This reflex varies less in health than the knee-jerk in excursion and activity, and is the most easily elicited and uniform of all tendon-reflexes. (2) The Achilles jerk disappears, as a rule, early in tabes dorsalis, and its absence is as diagnostic of that disease as is loss of the knee-jerk. We have not seen a case far enough advanced to establish tabes with the persistence of the Achilles jerk, except one case in which both the knee-jerk and the Achilles jerk were present on one side only. We have observed bilateral preservation of knee-jerk and loss of Achilles jerk in 2 out of 5 cases of tabes. (3) Enfeeblement of knee-jerk in health on one side or both may be due to prior toxic influence, as diphtheria. This may also be true of the Achilles jerk, though in one case in which it could be demonstrated of the knee-jerk the Achilles jerk was normal. Further observations on this point are desirable.

G. Carriere⁴ has made a careful search for **Kernig's sign** in 50 cases of **typhoid fever** occurring in children in his service. The sign was noted

¹ Phila Med. Jour., May 2, 1903.

² Interstate Med. Jour., Oct., 1903.

³ Jour. Nerv. and Ment. Dis., June, 1903.

⁴ Le Nord Medical, Feb. 15, 1903.

in 22 instances—in 15 very clearly, in 7 slightly. In all cases in which the sign was noted cytoscopic examination of the cerebrospinal fluid was made. Only once a slight polynucleosis was found when cultures were made sterile. In general the sign was observed from the third to the sixteenth day of the disease, usually disappearing about the thirteenth or fourteenth, but it may reappear or appear for the first time at the development of the complication. In all of the fatal cases in this series the sign was found.

M. Pfaundler¹ has noted the frequency of loss or great diminution of the **knee-jerk in children during croupous pneumonia**. For 7 years he has watched this point in the children's clinic in Gratz. He found that in 200 cases of croupous pneumonia the knee-jerk was either absent or diminished in 55, while in healthy children the knee-jerk is very rarely diminished. The cases in which diminished knee-jerk were commonly noted were severe and often affected with early cerebral symptoms. It was also noted that the knee-jerk may be diminished or absent before physical signs of pneumonia have developed, thereby furnishing some diagnostic aid.

A. von Kornilow,² in reference to the **Babinski phenomenon**, does not believe that it is an absolute sign as between organic and functional hemiplegia. He believes that there are cases of hysteria in which the Babinski phenomenon is observed, and certain other cases of involvement of the pyramidal tracts in which it fails to be present.

Cerebral Localizations.—Prof. F. Durante³ reports several cases illustrating the subject of **cerebral localizations**. In one case the muscular sense was profoundly altered, as demonstrated by baric and stereognostic disturbances, though the Rolandic zone was not in the least involved. From the various facts adduced he derives the following conclusions: (1) That lesions, especially those determined by neoplasms, of the frontal lobes are nearly always accompanied by very grave phenomena of altered intelligence; which proves that the frontal lobes, and particularly the prefrontal, must be considered as the seat of the most elevated functions of the mind. (2) That the cortical center for hearing is situated in the temporal lobes, that each center is in relation with both the auditory nerves, and that the direct auditory bundle must be very much less active and smaller than the crossed auditory bundle. (3) That the site of the center for general sensibility and for muscular sense is in the parietal lobes, and that disturbances of general sensibility and of the muscular sense may occur in the limbs independently of any disturbance of motility.

The Sense of Taste.—H. Cushing⁴ reports a careful study of 13 cases in which the gasserian ganglion had been extirpated, with reference to the **persistence of the sense of taste**. The usual description of the course of the taste fibers is eventually to reach the brain by way of the fifth nerve. The author concludes: (1) That the perception of taste is unaffected on the posterior portion of the tongue and never permanently

¹ Münch. med. Woch., July 22, 1902. ² Deut. Zeit. f. Nervenheilk., March, 1903.

³ Brit. Med. Jour., Dec. 13, 1902. ⁴ Johns Hopkins Hosp. Bull., March, 1903.

or completely lost on its anterior two-thirds after removal of the gasserian ganglion. (2) That a temporary abolition or lessening of the acuity of taste may be found to exist over the anterior and anesthetic portion of the tongue for some days after the operation. (3) That this temporary loss of function may possibly be occasioned by some interference with the chorda transmission brought about by a mechanical or toxic disturbance due to degeneration of the nervus lingualis. (4) That a lesion of the trigeminal nerve may be associated with disturbance of taste over the chorda territory without the necessary inference that the nerve is a path for gustatory impulses. (5) That the nervus trigeminus in all probability does not convey taste fibers to the brain either from the anterior or posterior portion of the tongue.

Intermittent Limping.—H. Idelsohn¹ has made a collection of a large number of cases of intermittent limping from the literature, to which he has added a number of personal observations, being unusually fortunate in encountering these cases. He gives brief histories of 14 instances and in a foot-note adds a sketch of 8 more. Of these 14 cases, 11 were in men and 3 in women, and they appeared between the ages of 27 and 59, an average of the ages being 44. In regard to the arterial pulse in the lower extremities, he found that most frequently the dorsal foot artery was pulseless. This occurred 22 times in a possible 28. The pulse of the posterior tibial artery was absent 21 times, and its absence was usually attended by a proportionately greater amount of pain than in the cases where it persisted. He noticed that in 4 cases there were anomalies of the radial artery also. In one instance the radial pulse disappeared during an observation period of 2 years. In 8 cases out of the 14 there was double-sided flat-foot. Once it was unilateral. Of his 14 patients 12 were Hebrews, and he calls attention to the fact that Higier found 22 Hebrews out of 23 cases and Goldflamme in 27 cases 27 Hebrews. Syphilis, heredity, nicotin, and alcohol were included as causative agents, without, however, arriving at any indication of their importance. The author lays particular stress upon the constitutional make-up of the patients and the abnormalities and peculiarities of the arterial system, believing that in a sense the cases are largely congenital. The frequency of flat-foot is in his estimation much more than a coincidence.

Conduction in the Anemic Spinal Cord.—Max Lowenthal² concludes: (1) The first effect of arrest of the circulation on the functions of the spinal cord is an increase in the readiness and strength of interneuronal transmission of nerve energy lasting about 30 seconds. (2) After from one to two minutes, stimuli approaching the gray matter through peripheral nerves or fibers of the white substance are not transmitted to the lower neuron. (3) It is probable that every single neuron as a functional unit retains its vitality for a period exceeding 15 minutes, but that the mechanism which links the separate neurons together is quickly destroyed by death. (4) The existence of genuine spinal fits cannot be disputed.

Ophthalmoplegic Migraine.—J. W. Russell³ reports a very interest-

¹ Deut. Zeit. f. Nervenheilk., Sept., 1903.

² Brain, Autumn, 1902.

³ Brit. Med. Jour., May 2, 1903.

ing case of ophthalmoplegic migraine in a boy of 13. The attacks dated from birth, and recurred, being accompanied by severe headache, at intervals of about a fortnight. The longer the interval, the worse the attack. During the attack the left eye was turned outward; there was complete ptosis, dilated pupil, and involvement of all branches of the third nerve, with perhaps a little paresis of the left superior oblique. The author has been able to find only 6 cases reported in the English literature, but believes the disease is more frequent than this would indicate.

Arterial Sclerosis as a Cause of Nervous Disease.—M. A. Starr¹ contributes a very instructive article on the causal relation of arterial sclerosis in many nervous disorders and diseases. Anteropoliomyelitis, bulbar paralysis, and ophthalmoplegia are infectious diseases, the infection reaching the particular location through the vascular supply. In some cases the mechanism is that of thrombosis, and in others it is rupture. Myelitis, disseminated or local, is also traceable either to infection or rupture of the bloodvessel. Arterial changes in the majority of these cases are demonstrable. Spastic paralysis and syphilitic paraplegia are undoubtedly due to malnutrition of the cord with subsequent descending degeneration based upon arterial changes of a specific character, usually an endarteritis of the obliterating type. Senile paraplegia, appearing as a rule after the age of 60, advancing slowly, and finally complete, is associated with arterial sclerosis of the circulation of the lower portion of the cord and with the large vessels supplying the lower extremities. Combined sclerosis and ataxic paraplegia of Gowers is due to malnutrition of the posterior and lateral columns of the cord. Degenerative disease, usually a sclerosis, in the peripheral nerves, due to endarteritis of the vessels accompanying them, produces local disturbance. In chronic alcoholism sudden attacks of brachial or sciatic neuritis are observed, due to this cause. Cerebral apoplexy and thrombosis are invariably secondary to arterial changes. Various forms of neuralgia are due to sclerotic retrogressive modifications of the circulation. This is particularly true of the trifacial neuralgia appearing late in life. Hemorrhage into the posterior spinal ganglia may produce both herpes and neuralgia, such hemorrhage being due to infection of the vessel-wall. [In addition, the author might call attention to the vascular element in Graves's disease and a peculiar form of intermittent lameness due to obliteration of arteries in the lower extremities, a similar condition sometimes occurring in the upper extremity; modification of the vessels in erythromelalgia and Raynaud's disease. Cerebral vertigo is also a common symptom of vascular change in the brain, and numerous other conditions might be mentioned in making a complete list of these disorders of the nervous system dependent upon vascular changes.]

Myasthenia Gravis.—T. Diller² reports a case of myasthenia gravis complicated with angioneurotic edema, and he believes the relation between them is an interesting one not heretofore recorded, but one difficult to determine, as the nature of neither affection is known. He thinks,

¹ Med. Rec., July 4, 1903.

² Jour. Nerv. and Ment. Dis., April, 1903.

however, that both are due to the same underlying cause, and is disposed to attribute them to vasomotor lesions.

Articular Amyotrophy.—G. Pighini¹ reports certain experiments to determine the mechanism of this condition. The knee was the chosen articulation for the experiments. Examinations of the crural and sciatic nerves and those that supply the affected muscles were carried out, the nerves being treated by osmic acid, by Hermann's method. Control examinations showed that no alterations existed in the healthy limb. In the affected limb there was a numeric increase of the fine fibers of the nerves. The myelin sheath was completely absent in some cases and wasted in others. True degeneration was not found, but an impaired condition of the nerves, which is commonly called a periaxile neuritis. The myelin was wasted and sometimes totally wanting at the nodes of Ranvier. The cord showed peculiarities, in the spinal enlargement presenting unequal sizes of the diameters of the anterior horns. In the author's cases acute articular affection was invariably followed by pathologic manifestations in the lumbar enlargement. The affected muscles were diminished in size, discolored, and the transverse striae were impaired or wanting. The sarclemma nuclei were increased and their arrangement disordered. The vascular condition was normal. The author concludes: (1) Amyotrophy that follows shortly after the onset of an articular inflammation is of a reflex vasomotor origin. (2) The reflex action is conveyed from the joints, through the sensory avenues, to the spinal ganglia, the vasomotor trophic centers, the sympathetic ganglia, and the vasomotor nerves. (3) The muscular atrophy depends very probably on ischemia caused by prolonged vascular spasm.

DISEASES OF SPINAL MENINGES AND SPINAL NERVES.

Multiple Neuritis Due to Sulfonal.—W. Erbsloeh² makes a study of multiple neuritis following sulfonal. He clearly describes and illustrates the changes in the peripheral nerves. His patient showed hematoporphyrin and presented a well-marked suicidal tendency. Microscopically the lesion was found in the peripheral nerves. No change was found in the ganglion-cells of the anterior horns and the anterior roots were not affected.

Peripheral Neuritis.—J. M. Clarke³ reports cases of diphtherial and aleoholic paralysis showing marked changes in the cellular structure of the spinal cord. In the diphtherial case there was absence of any antecedent illness or source of diphtherial infection, but the paretic symptoms were typical. All of the parts of the lowest motor neuron were involved and also the afferent fibers of the posterior roots and posterior columns and the cells in Clark's column. The character of the pathologic changes indicated the process to be degenerative, involving apparently the direct action of the toxin upon the anterior horn cells and their extensions, and not a secondary change in the cells, their reaction

¹ Jour. Ment. Pathol., vol. iii, Nos. 4, 5. ² Deut. Zeit. f. Nervenheilk., March, 1903.

³ Brit. Med. Jour., Sept. 12, 1903.

at a distance, as is sometimes assumed. The alcoholic case was one of paraplegia, the arms being affected. There was paralysis with wasting of muscles and reaction of degeneration of the ordinary type. Sections of the anterior and posterior tibial nerve showed degeneration of nerve-fibers with secondary interstitial changes. The cord stained by Nissl's method showed changes in the cells of the anterior horn, as a rule less advanced than those in the case of diphtheria. The degenerated cells were fewer in number and confined to the lumbar enlargement, being absent in the dorsal and cervical regions.

A. A. Eshner¹ reports cases of **whooping-cough complicated by peripheral neuritis**. This is a rare complication, not even being referred to by the textbooks, and only a small number of cases are recorded. The inflammation may involve one or many nerves, and those of special as well as those of common sensibility. Of the latter variety, the author has collected cases by Surmay, Jurasz, Moebius, Mackey, Craig, Leroux, and Quinon. The author confines his attention to the peripheral disorder, though after whooping-cough other portions of the nervous system, as brain, medulla, spinal cord, may suffer by inflammation, hemorrhage, thrombosis, or embolism. Valentine,² for instance, collected 83 cases due to all causes, 62 of which were cerebral.

S. J. Cole,³ after making a study of the **changes in the central nervous system** in the neuritic disorders of chronic alcoholism, states that in all these varieties of nervous disease occurring in alcoholic patients the affected neurons, central and peripheral, present the same essential lesion—a cell change of distinct type, with or without degeneration of the myelin sheath of the parts most remote from the cell. The changes in the neuron do not begin in the prolongations, but express a disorder which leads to such general impairment of the whole neuron that the parts furthest from the trophic center degenerate. The affection is poly-neurial rather than polyneuritic. In all forms we have to do with a general toxemia affecting the whole neurons of many different orders throughout the nervous system, and rarely or never affecting peripheral neurons only. In some cases the peripheral neurons are the more vulnerable, in others the central. Hence in some cases the "peripheral neuritis" predominates, in others the "central neuritis." Thus the physical illness is closely related to a number of affections which come within the province of the alienist. The typical case of severe peripheral neuritis, familiar in the hospital ward, is connected by any number of intermediate forms with several varieties of confusional insanity, delirium, and allied disorders, in which there may be no appreciable peripheral affection.

Erythromelalgia.—H. B. Shaw⁴ has had an opportunity of making **histologic examinations** of 3 cases of erythromelalgia. He has also examined the literature of the subject, and finds that of the 9 cases that have been subject to examination, one showed what appeared to be a reduction in the number of nerve-fibers in a portion of excised nerve with

¹ Jour. Am. Med. Assoc., Jan. 10, 1903.

³ Brain, Autumn, 1902.

² Paris Thesis, 1901.

⁴ Brit. Med. Jour., March 21, 1903.

an increase of fibrous tissue. Another showed degeneration of posterior nerve-roots but the peripheral nerves were healthy. All cases have shown vascular changes which were present in the 3 instances reported by the author. Such changes are general increase in the intima, occasionally with thrombosis and changes of the inner coats of the veins. In all 3 cases investigation of the nerves to their final terminations showed no change and there was no suggestion of increase of fibrous tissue in the nerve-trunks. The author therefore reaches the conclusion that erythromelalgia when occurring independently of central nervous change has but one morbid picture, that of local vascular change.

Multiple Neuromas.—H. M. Thomas¹ reports a case of **neurofibromatosis**, or von Recklinghausen's disease, with paralysis and muscular atrophy of the arms and legs. The case is shown by photographic illustrations. He makes the following classification of neuromas in tabular form:

" NEUROMA."	TRUE.	Neuromaverum ganglio-cellulare	{ myelinicum amyelinicum	The occurrence of true neuroma in which ganglion-cells are absent is doubtful.
		1. Circumscribed or solitary tumors, growing from the connective tissue of nerve trunks, or of the ganglionic enlargements of nerves.		
" NEUROMA."	FALSE.	2. Diffuse overgrowths of the connective tissue sheaths of nerves and of ganglionic enlargements of nerves. Neurofibromatosis.	{ Innocent Malignant	Fibroma, myxoma, etc. Cysts from liquefaction of solid tumors (myxoma). The clinical "painful subcutaneous tubercle" is included here.
		3. Traumatic or division neuromas.		
	4. Enlargement of nerves in leprosy, syphilis, tuberculosis.	Diffuse and generalized fibromatosis of trunks of nerves ("multiple neuromata").	{ Plexiform neurofibromas. Cutaneous neurofibromas (molluscum fibrosum). Elephantiasis neuromatosa (pachydermatocoele).	Various combinations of these.
		Pigmentation of skin of nerve origin. "Secondary malignant neuroma," being the sarcomatous transformation of one or other of the above.		

Brachial Plexus Injury at Birth.—R. Kennedy² reports several cases of birth-palsy due to injury of the brachial plexus in which **operation was done with benefit**, and presents illustrations of his cases showing the improvement. In the 3 cases reported the junction of the fifth and sixth nerves was apparently cicatricial. This portion was excised and the ends approximated by suture, no difficulty being encountered in getting them together when the shoulder was raised and they were approached at Erb's point above the clavicle, by an incision extending from the outer border of the sternomastoid at its junction with the middle and lower thirds, passing outward and downward to the junction of the outer third and middle of the clavicle.

¹ Johns Hopkins Hosp. Bull., Aug., 1903.

² Brit. Med. Jour., Feb. 7, 1903.

Herpes Zoster.—W. T. Howard, Jr.¹ contributes a paper on the pathology of labial and nasal herpes and of herpes zoster occurring in acute pneumonia, and their relations to herpes zoster. He concludes: (1) Herpes zoster is a pathologic condition, like pneumonia, for instance, with definite lesions of certain sensory ganglia, sensory nerves, and the skin, capable of being excited by a variety of causes. It is probable that the primary ganglionic lesions are commonly due directly or indirectly to the soluble toxins of various microorganisms. The skin-lesions may be on the head, neck, trunk, or extremities, corresponding to the gasserian and posterior root ganglia affected. (2) Various forms can be distinguished: (a) Spontaneous or primary herpes, thought by Head and Carpenter, and others, to be a specific infectious disease, the specific causal agent of which has a special affinity for certain sensory ganglia (posterior spinal and gasserian). (b) Herpes occurring after certain definite toxic agents, as arsenic and carbonic oxid gas, etc. (c) Herpes occurring in the course of certain infectious diseases, as pneumonia, cerebrospinal meningitis, and probably of malarial and typhoid fevers. The lesions of the ganglia and of the skin in the above three forms are the same, and the processes therefore presumably identical. (d) Herpes simplex, so called, affecting the lips and nose in coryza, gastrointestinal intoxications, etc., and genitals (herpes genitalis), has not been sufficiently investigated to be classified; no evidence exists for or against its connection with changes in the nervous system. (3) So far as changes in the skin in herpes are concerned they are illustrations of particular forms of necrosis and inflammatory reaction, and, as in similar lesions in other organs, can probably be excited in a variety of ways. (4) Herpes should be classified according to its relation to changes in the nervous system, and to this end every possible opportunity should be embraced for extending our knowledge in this direction.

DISEASES OF THE SPINAL CORD.

Locomotor Ataxia.—J. Collins² discusses the question of **muscular atrophy** in tabes. He has had opportunity to make careful autopsy examination in several such instances. In one it was dependent upon either a peripheral lesion, as a neuritis, or due to a thrombosis of the anterior spinal artery involving the anterior horn, similar to another thrombosis within the brain causing hemiplegia. In another case he interprets the atrophy as dependent upon a multiple neuritis of alcoholic origin. It is therefore evident that atrophy in tabes may be due either to a so-called peripheral lesion or one involving the cord proper. It is sometimes difficult, even impossible, to make the distinction intra vitam.

G. E. Rennie³ calls attention to the presence of **astereognosis in tabes** in cases in which there was no evidence of cerebral lesion that would explain the disturbance of the astereognostic sense.

¹ Am. Jour. Med. Sci., Feb., 1903.

² Jour. Nerv. and Ment. Dis., June, 1903.

³ Brit. Med. Jour., Feb. 7, 1903.

J. Nageotte¹ has investigated the early development of tabes, and his researches tend to show that it depends upon a generalized **inflammation of the meninges** whereby certain of the sensory or motor nerve-roots are attacked on leaving the subarachnoid space. The changes in the root fibers of the posterior columns of the cord are secondary to the meningeal involvement. The process appears to begin at the extremities of the neurons within the cord and progress outward toward the trophic center in the intravertebral ganglion. In addition the parenchymatous tissues of the cord are involved in the syphilitic meningitis, the pia is thickened by cellular infiltration and changes in the vessels, especially the veins, and these are more conspicuous in the early stages of the disease. An important result of this meningeal inflammation is lymphocytosis of the cerebrospinal fluid, to be recognized during life by lumbar puncture. This lymphocytosis may be observed through the posterior roots before they are definitely attacked, therefore before symptoms of locomotor ataxia appear. The deduction the author derives is the necessity of early recognizing the involvement of the spinal meninges and their correction before secondary degenerative processes have occurred in the cord in order to obviate them by specific treatment. Various forms of neuralgia are due to sclerotic retrogressive modifications of the circulation. This is particularly true of the trifacial neuralgia appearing late in life. Hemorrhage into the posterior spinal canal may produce both herpes and neuralgia, the hemorrhage being due to infection of the vessel-wall. [In addition, the author might call attention to the vascular element in Graves's disease, a peculiar form of intermittent lameness due to obliteration of arteries in the lower extremities and a similar condition sometimes occurring in the upper extremity; modification of the vessels in erythromelalgia, and Raynaud's disease. Cerebral vertigo is also a common symptom of vascular change in the brain, and numerous other conditions might be named in making a complete list of these disorders of the nervous system dependent upon vascular changes.]

A. Rochon-Duvigneaud and J. Heitz² have examined the eyes with special reference to the **pupil reaction of 77 cases of tabes**, representing the most diverse forms in varying stages. Most of the cases were hospital patients under the care of Dejerine, whose diagnosis was accepted. The examination was directed (1) to form of pupil, (2) size, (3) reaction to light, (4) reaction to convergence, (5) external muscles, (6) changes in fundus and field of vision, (7) action of atropin and pilocarpin in extreme myosis or mydriasis. From a study of these cases the authors assert there is no relation between the condition of light-reflex and the stage of the disease. Paralysis of all the muscles of convergence is much rarer than that of accommodation. It occurred in only 3 cases out of 77, but in these the effort to converge, though ineffectual, produced contraction of the pupil. Out of 77 cases the pupil failed to react in 23 on both sides and 11 on one side. The complicated Argyll-Robertson sign was not present in any of the cases. In 31 cases the pupils were dilated

¹ *Presse Med.*, Dec. 10, 1902, and Jan. 3, 1903.

² *Arch. Gen. de Med.*, July 7, 1903.

in both eyes, in 7 in one eye only. In 3 optic atrophy was advanced and in 3 others incipient. Mydriasis occurred in 17 cases on both sides, in 9 cases on one side. The authors observed a marked dilation of the normal size pupil during a gastric crises. They suggest that the long duration of a painful stimulus will produce this reflex, notwithstanding the fact that Dejerine has shown that a short painful stimulus produces no change. In 7 cases of myosis atropin produced an incomplete dilation which persisted for 10 days. In 4 cases of mydriasis pilocarpin produced an incomplete contraction. It is therefore inferred that the muscles of the eyes, though long immobile, are not atrophied completely. In 30 % of the cases examined in the dark chamber the Argyll-Robertson sign is incomplete: 30 % of the cases present bilaterally, 13 % unilaterally, a complicated Argyll-Robertson sign—namely, a diminution or abolition of reflex contraction upon convergence. Myosis is regularly present when the Argyll-Robertson sign is pure. Optic atrophy rarely accompanies myosis. Ophthalmoplegia externa or interna is rare. When mydriasis accompanies a normal fundus, a total ophthalmoplegia interna is usually present. Mydriasis is most often present when the pupil reaction to accommodation and convergence is absent, the power of accommodation being preserved.

E. von Leyden¹ considers in the **etiology of locomotor ataxia, trauma, overexertion, and cold.** He reports the case of a man 32 years of age who is said not to have had syphilis, but who developed tabes on account of a fall on his head. The clinical signs were typical. He also records the case of a man 42 years old injured on the leg, a fracture of the malleolus, who later broke his left thigh and afterward developed signs of tabes. He then details some postmortem appearances. The whole gray matter of the spinal cord shows patches of softening. He refers to the work of Schmaus in syringomyelia and Stadelmann in connection with late apoplexy after trauma, and Minor's experiments on so-called nervous system concussion, which go to show that the symptoms of concussion are in reality due to small lesions of the blood- and lymph-vessels. Leyden is prepared to believe that the lesions may produce like lesions of the nerve-fibers. Thus, he reports that tabes is caused at times by the direct effect of trauma. In regard to overexertion, he instances cases of needlewomen who work for a long time at sewing-machines and without other cause develop tabes. Another case, that of a man who over-exerted himself by writing a great deal at night, was observed. He calls attention to Fuerstner's experiments, in which dogs were made to turn their heads for a number of times, causing degeneration in the lateral columns of the cord, and points out Edinger's statement that degeneration of the nervous system causes changes in the ganglia of the cells. Leyden explains this in the light of the neuron theory that the molecular arrangements are disturbed. He finds little further difficulty in appreciating how overexertion can lead to such a disease as tabes. He is also disposed to consider that cold may be causal. [These contentions are so at variance with the most recent and comparatively well-founded

¹ Berl. klin. Woch., May 18, 1903.

acceptance of the etiology of tabes that they must be taken with great caution. The exclusion of syphilis as a factor is almost an impossibility in any given instance, and certainly if cold, overwork, or trauma are competent to produce locomotor ataxia, they would much more frequently have that effect, inasmuch as nearly every individual during the course of his life is exposed to one or more of these conditions.]

Tumors of the Spinal Cord.—J. Collins¹ presents some remarks on the subject of tumors of the spinal cord. He notes that the **symptoms in their order of development** are sensory, motor, visceral, trophic, and topical. The sensory symptoms are pain of a more or less typical kind, paresthesia, and disturbance of pain, temperature, and contact. The motor symptoms are spasticity, involuntary twitching, drawing up of the extremity, painful muscular cramps, paralysis at first spastic and becoming flaccid, and increase of muscle reflexes. The visceral symptoms are probably referable to the bladder, and develop early if the tumor is in the lumbar or sacral regions of the cord with modifications of bowel activity. The trophic symptoms are muscular atrophy and bedsores, both late manifestations. The topical symptoms are tetanus on pressure over the spine in the region of the tumor and in some cases deformity of the spinal column. The first is fairly constant. There is also sometimes stiffness of the spinal column and often disagreeable sensations in the back when the body is jarred. The intramedullary tumors commonly produce an incomplete paraplegia, and the pain is rarely an initial symptom, while it is almost invariably so in tumor of the meninges and is of great severity. Limitation of motor symptoms to one side of the body is commonly found in extramedullary growths. The most important datum in determining the segment of the cord affected by the tumor is a study of the anesthesia. The segmental relation of the cord to the body-periphery having been carefully mapped by many observers, the general tendency is to localize the tumor too low, and the surgeon should bear this in mind. Generally the tumor is from 2 to 4 inches above the uppermost level of the anesthesia. The importance of spinal sensitiveness as an aid in localizing the tumor is considerable. The favorite location for spinal-cord tumor is in the dorsal region. In 70 cases 35 were of the dorsal region, 15 of the cervical, 13 of the lumbar and sacral, and 6 of widespread distribution. Of the 70 cases mentioned by the author, collected from personal experience and the literature, 30 were operated, successfully 12 times, partially successful 8 times, entirely unsuccessful 10 times. So far as could be determined, there were 6 fibromas, 12 sarcomas, 3 endotheliomas, and 1 myolipoma. Patients who succumbed shortly after the operation usually had sarcomatous cases. All the patients with fibroma recovered with one exception, who perished from sepsis, and sepsis caused death in 13 of the fatal cases, while collapse, exhaustion, shock, hemorrhage, and pneumonia accounted for the fatal termination in 5 cases. It appears that 44 out of the 70 cases of spinal tumor might have been treated surgically, and as the results are fairly good, this renders spinal-cord tumor one of the most operable conditions of new-growths affecting

¹ Med. Rec., Dec. 6, 1902.

the cerebrospinal apparatus. The question is, What improvement may be expected from operation? The author thinks that unless benefit is shown within 2 or 3 months little is likely to occur.

Putnam, Krauss, and Park¹ report a case of sarcoma of the third cervical segment, removed by **operation, with continued improvement.** The authors quote the various tabulations of cases of spinal tumor with operation which indicate that sarcoma is by far the most common growth affecting the spinal cord, being present in about 30 % of all cases operated. It is most common in the thoracic region, the cervical being the least frequently affected, and the extradural position is much more frequent than the intradural location, while intramedullary tumors are extremely rare. The recovery in operated cases is about 30 %. In the case reported by the authors operation detected a small reddish tumor, looking like the choroid plexus, in a subdural position, originating apparently in the pia, about 2 cm. in length with a diameter a little larger than that of a common lead-pencil. It was removed with readiness. The patient's condition was good after the operation and he made an uninterrupted surgical recovery. The condition had been one of paraplegia. In the 10 weeks that elapsed subsequent to the operation motion returned in all the muscles that had been affected in the right arm and leg, but sensation in the right side did not return, although it did return on the left side, where motion did not return, presenting the Brown-Séquard syndrome at that time.

Henschen and Lennander² report a very interesting case of **removal of a tumor from the cervical portion of the spinal cord.** The patient was a man of 50 of previous good health. After some transitory symptoms, such as numbness and tingling in the extremities, difficulty in urination, and impaired walking, there appeared a progressive loss of power in the lower limbs and of sensation in most of the body, including the arms, followed by paralysis of the right lower limb, paresis of the left lower limb, at which time there was anesthesia of both lower limbs and the trunk to the level of the second rib. There was also anesthesia over the right forearm, also the left, and complete paralysis of the hand and forearm on both sides. After removal of the fifth, sixth, and seventh cervical vertebrae, division of the dura exposed a firm spindle-shaped tumor back of the cord on the right side and extending 3 mm. beyond the middle line; the upper end of the tumor corresponding to the middle of the fifth cervical vertebra and the lower end to the fourth dorsal. It was movable and extracted without difficulty, leaving a deep impression on the posterior and right lateral surfaces of the cord, corresponding to the attachments of the sensory nerves. It proved to be a fibrosarcoma. The patient made a good recovery and 8 months after the operation was able to walk and leap with both legs, and had regained complete use of his arms.

Myelitis.—Davisson and McCarthy³ report a case of **transverse**

¹ Am. Jour. Med. Sci., Jan., 1903.

² Mittheil. a. d. Grenzg. d. Med. u. Chir., Bd. x, Heft 15, 1902.

³ Phila. Med. Jour., Feb. 21, 1903.

myelitis in a newborn infant. The parents were healthy and had had 4 children. The child was delivered by the feet, and it required an hour's work to secure respiratory action; also considerable traction was exercised in the delivery. Four weeks after the child's birth the mother noticed the baby's inability to move its lower extremities and it seemed not to notice when it was touched on this part of the body. At the age of 8 weeks, when the child was first seen by the reporters, it would move its head and arms freely, but the rest of the body remained inert. There were no respiratory movements of the thorax and abdomen, but the diaphragm operated. The lower limbs were perfectly flaccid with no voluntary movement. The urine passed naturally, but enemas were required for the bowels. Later on the bladder was found to be distended, reaching as high as the umbilicus. Knee-jerks, plantar reflexes, and skin-reflexes over the abdomen were wanting. Sensation to the pin-prick was lost on the anterior aspect of the body as high as the sternum and up to the second thoracic vertebra behind. The arm and palmar reflexes were present, and the pupils reacted to light; there was no spinal deformity. The baby finally died, and the cord was found collapsed and flattened from the second dorsal to the eleventh dorsal segments. Cervical and lumbar enlargements appeared normal in size. Over the collapsed area the pia was thickened and the superficial vessels were distended. Microscopic examination was unsatisfactory, but the cell-grouping and the relation of the gray and white matter appeared normal. Although the first appearance suggested congenital defect, later study led to the conclusion that the condition was the result of some assault to the nervous system after complete cord formation, and this the authors are inclined to attribute to the delivery by the feet at the time of birth.

Tytler and Williamson¹ report a case of **myelitis due to compression by hydatid cysts**, with the ordinary symptoms of myelitis, in the dorsal region, complete paralysis of both legs, anesthesia of the legs and lower half of the trunk, complete paralysis of the bladder and rectum. Fifteen spinal hydatid cysts were removed by extradural operation. There was gradual improvement with complete recovery of sensation and of control of the bladder and rectum and great recovery of motor power in the legs. There was still some spasticity 2½ years after the operation, but the patient was able to walk alone, with a cane. The authors have found references to 4 successful operations for spinal hydatid, in all of which, except one, considerable recovery took place.

Weill and Gallavardin² record a case of **diffuse myelitis with double optic neuritis**. The ophthalmoscope showed a distinct active optic neuritis without hemorrhage. The vision improved a little before death, which was due to bronchopneumonia. The spinal cord was found yellow, flattened and anemic in the lower dorsal regions, and was infiltrated with round-cells, the anterior horns showing various degrees of chromatolysis or complete atrophy, and in places cavities were found containing softened debris of nerve-fibers. Sections showed an abundance of infiltration of round-cells, more marked in the white than in the gray matter. The

¹ Brit. Med. Jour., Feb. 7, 1903.

² Lyon Med., Aug. 9, 1903.

optic and sciatic nerves were also infiltrated with granular cells which interrupted the nerve-fibers. The etiology of the cases is unknown, but is attributed to an acute inflammatory process affecting the nervous system.

Landry's Paralysis.—E. F. Buzzard¹ investigated a case of Landry's paralysis, and found briefly as follows: (1) A microcococcus was isolated in pure culture from the blood of a patient who died of Landry's paralysis. (2) An organism, indistinguishable from that which was cultivated, was found in large numbers in the external part of the spinal dura of the same patient. (3) A subdural injection of the cultivated coccus into a rabbit produced after some days a rapidly spreading palsy. (4) The same organism was discovered in the dura mater of the rabbit and isolated in pure culture from its blood. (5) The changes in the nervous system in both the patient and the rabbit were of the kind produced by toxins, and in neither case was the microbe to be demonstrated in the nervous structures themselves or in the pia-arachnoid.

Taylor and Waterman² report 2 cases of **Landry's paralysis with autopsies.** In the first case the condition of brain and spinal cord was practically negative, with the exception that in some places in the cord there was congestion of bloodvessels associated with hemorrhage and lesions of relatively slight character in the ventral horns. In the second case the vessel-walls were normal, but the smaller ones were filled with blood to a degree not usually seen, though there was no free hemorrhage. The vascular condition was also apparent in the dorsal region, and even in the bloodvessels of the dura, but nowhere presenting signs of inflammation. Thus in both these cases the fatal outcome is not explained by the pathologic findings. Both cases corresponded clinically to the typical Landry's paralysis. The authors point out that we are far from an etiologic basis for the classification of so-called Landry's paralysis, and they would provisionally classify the diversified cases on a pathologic basis, reserving the clinical designation of Landry's paralysis for the small number of cases in which no anatomic changes are found postmortem, distributing the others according to the pathologic lesions actually discovered.

Amyotrophic Lateral Sclerosis.—J. Collins³ reports an interesting case of atrophy in a woman of 36, her symptoms being pain in the neck and head, weakness of the upper extremities and the muscles that support the head, followed by atrophy and fibrillary twitching of the muscles of the shoulder, girdle, neck, and hands, followed by exaggeration of all the tendon-jerks, slight spasticity of the lower extremities, slight contracture of the arms and hands, the Babinski sign, and early bulbar manifestations. In this instance careful examination of the cord detected no involvement of the lateral tracts, contrary to the rule.

Poliomyelitis.—C. F. Painter⁴ reports an **epidemic** of 38 cases of poliomyelitis. There were 23 males and 9 females. The youngest was 13 months and the oldest 10 years. None of the patients got entirely well, but only

¹ Brain, Spring, 1903.

³ Am. Jour. Med. Sci., June, 1903.

² Boston M. and S. Jour., Dec. 25, 1902.

⁴ Boston M. and S. Jour., Dec. 11, 1903.

one died. In several of the cases there were brain symptoms, as delirium; and in one a right facial paralysis; in another, the involvement of several cranial nerves; in a third hemiplegia, convulsions in a fourth, and facial convulsions in a fifth. Some of the cases corresponded, as is customary in such epidemics, to a cerebritis involving the cranial nuclei, a polioencephalitis inferior.

Syringomyelia.—A. Gordon¹ reports an interesting case of syringomyelia presenting sensory disturbances affecting one limb and cutaneous trophic changes affecting this entire limb. The sensory disturbance was a typical dissociation and the trophic changes involved the subdermal structures in the affected area. The author is disposed to trace the condition to a fall which the patient had 10 years before she was under observation, which was not attended by unconsciousness, but she immediately felt a severe pain around the waist which lasted about half an hour. There was no disturbance during the following two weeks, at which time she began to complain of numbness, sensation of pins and needles, and burning and aching of both hands. This would disappear while she was at work and reappear when she rested. Thereafter the condition was progressive, but the trophic sensory disturbances became limited to the left upper extremity, the left side of the chest, and the left side of the head.

Insular Sclerosis.—John Green and S. I. Schwab² report a case in which the early diagnosis was favored by the presence of **changes in the ocular apparatus**, particularly in the optic nerve. They give considerable weight to the importance of the careful study of the ocular apparatus in obscure nervous conditions, and particularly those suggestive of multiple sclerosis, as likely to furnish very early evidence of the disease, which otherwise could not be distinguished. The ophthalmoscope reveals changes in the papillas in about one-half of all the cases, the most frequent appearance being a slight grayish discoloration of the entire disc. Atrophy of the temporal half of the papilla, giving an appearance resembling that of toxic amblyopia, is often found. The disturbance of the eye-muscles showing nystagmus is also given due consideration.

DISEASES OF CEREBRAL MENINGES AND CRANIAL NERVES.

Meningitis.—Cabot and Nevol³ report a case of meningitis apparently caused entirely by **Eberth's bacillus**, but associated with chronic tuberculosis. An immediate examination of pus, removed with great care, showed the presence of organisms with all the characteristics of Eberth's bacilli, and cultures carefully made, together with the intestinal lesions and positive serum reaction, put the nature of the typhoid infection as beyond doubt.

Facial Paralysis.—Ballance, Ballance and Stewart⁴ report some cases in which marked facial palsy of peripheral origin was treated

¹ Phila. Med. Jour., May 9, 1903.

² Interstate Med. Jour., Oct., 1903.

³ Lyon Med., March 9, 1903.

⁴ Brit. Med. Jour., May 2, 1903.

surgically by performing an anastomosis between healthy nerves and the distal segments of the paralyzed facial. In the cases presented, being assured by galvanic stimulation that muscle-fibers still survived on the paralyzed side of the face, the facial nerve was exposed at its exit from the stylomastoid foramen. The nerve was cut across as close as possible and a minute section preserved for microscopic examination. The spinal accessory was then exposed, its sheath incised at a point convenient for union with the divided facial, and into it the distal segment of the facial was fixed by means of fine sutures. After healing, the muscles of the paralyzed side were assiduously stimulated by galvanism for months until faradic excitability appeared, when this form of current was substituted. This operation had been previously done in 1895 by one of the authors, and in 1898 by Foure. The patients gained the power of moving the paralyzed side of the face by a voluntary attempt to throw the shoulder muscles into operation. There was a tendency for the face to regain its symmetry. The authors conclude: “(1) Peripheral facial palsy is remediable by facio-accessory anastomosis, but the extent of recovery appears to be limited to associated movements in conjunction with the shoulder. In most cases the previous deformity disappears when the face is at rest. (2) For reasons above stated we would in future recommend facio-hypoglossal anastomosis rather than facio-accessory. (3) The cases suitable for operation are those in which the paralysis has lasted so long that no recovery is to be expected, as, for instance, facial palsy lasting 6 months without any sign of recovery. In our opinion the sooner the operation is done after this date, the better. (4) A suppurative causal condition producing an infective neuritis renders the prognosis after operative treatment less favorable than in cases due to trauma.”

DISEASES OF THE BRAIN PROPER.

Cerebral Hemorrhage.—Lambotte¹ reports 2 cases of cerebral hemorrhage treated by trephining for the purpose of removing the clot. In the author's opinion the surgeon should attempt to reach the seat of hemorrhage and prevent cerebral compression by removing the clots, and also to prevent infection of the attacked portion of the brain. The cranium having been trephined in the region of the fissure of Sylvius, the dura mater should be incised and the brain punctured by a needle in the direction of the internal capsule. If the hemorrhagic focus is discovered, it should be exposed by incision and the cavity freely laid open and drained with gauze. Often the operation will remain exploratory, and in many cases, such as those of ventricular and bulbar hemorrhage, such treatment will be quite useless, as the author acknowledges, but he thinks in certain cases life may be saved, and believes that the method outlined is free from serious risk. In his first case the hemorrhagic cavity was exposed in the parietal lobe and several clots with cerebral detritus were removed, the operation resulting in rapid and complete cure. In the second case a clot was not found, but the patient derived considerable

¹ Ann. et Bull. de la Soc. de Med. d'Anvers, July-Aug., 1902.
26 M,

benefit from the relief of intracranial pressure. The author does not believe in carotid compression or ligature.

Alfred Gordon¹ submits a valuable study of **sensations in motor paralysis of cerebral origin**, based on 35 cases. He found that in all four portions of the body,—that is, upper limb, lower limb, trunk, and face,—pain sensations suffer most, next temperature, and last of all touch. Hypoesthesia is present the largest number of times, while anesthesias are comparatively rare, and hyperesthesia even more so. In the largest number of cases the upper extremity showed sensory disturbance. The face is least affected. The stereognostic sense was disturbed in 29 of the 35 cases and completely lost in 22. Stereognosis was involved in all the other elements of sensation, which favors the conception that the stereognostic sense depends upon the integrity of the three cardinal sensations. The sense of posture, however, was involved in but 17 cases out of 35, while the three cardinal sensations in the upper limb were disturbed in the great majority of cases, showing independence of the posture sense and those of cutaneous sensation. He found that, as a rule, the disturbance of sensation diminished with time. He concludes that hemisensory disturbances probably always accompany a motor paralysis of cerebral origin, no matter to what extent the latter is marked. Paralytic or even paretic symptoms will at the same time show sensory symptoms. The demonstration of this will depend upon the persistence of the investigation.

Mills and Spiller² report a case of progressively developing hemiplegia, later becoming triplegia, resulting from primary degeneration of the pyramidal tracts. This case was one in which hemiplegia gradually developed on the right side, the lower extremity being more markedly and probably earlier affected than the upper, the case therefore at first belonging to the clinical type of unilateral progressive ascending paralysis. After several years the left lower extremity also became paralyzed, but not to the same extent as the right. The reflexes were all markedly exaggerated, the Babinski response being present. Sensory symptoms were absent. Microscopic examination showed intense and long-standing degeneration of the right crossed and the left direct pyramidal tracts, the degeneration extending into the pons but not into the left cerebral peduncle; also comparatively recent degeneration of the left crossed and the right pyramidal tracts, traced by the method of Marchi into the lower part of the right internal capsule. No lesions, degenerative or focal, were found elsewhere in the brain or spinal cord; the case, therefore, was one of primary degeneration of the motor tracts, much greater and older in the right crossed and left direct pyramidal tracts.

Brissaud³ states that in his experience apoplectic attacks usually present the **Babinski symptom**. This is found very early and furnishes an important diagnostic sign. After the first day it is likely to disappear and develops later.

¹ Jour. Nerv. and Ment. Dis., March, 1903.

² Jour. Nerv. and Ment. Dis., July, 1903.

³ Neurolog. Centralbl., May 1, 1903.

Nonsuppurative Encephalitis.—H. Brooks¹ reports a case of acute nonsuppurative encephalitis with **histologic examinations**: The chief lesions of the central nervous tissues may be summarized as follows: (1) Cerebrospinal meningitis, probably secondary to cerebritis and of the "cellular" type as described by Delafield and Prudden. (2) General nonseptic cerebritis affecting all parts of the cerebrum, but most marked in the cortex, and particularly so in that of the motor areas. The disease is characterized pathologically by perivascular round-cell infiltration, dilation of the lymph-spaces, and by areas of neuroglial proliferation. The changes are further identified as inflammatory by the presence of occasional plasma-cells. (3) Degeneration of many of the ganglion-cells of the cortex. From the character of the lesions of these cells it is inferred that in most cases the changes have been of recent origin. Possibly some are postmortem alterations. (4) Degeneration of many of the fibers arising from the large pyramidal cells of the cortex, most marked in those derived from the motor areas. (5) Diffuse degeneration affecting many of the fibers passing through both internal capsules. (6) Inflammation of the tissues of the cerebellum, of much less marked degree than in the cerebrum, but apparently of the same character and accompanied by similar but much less extreme changes in the cells and fibers. (7) Degeneration of many of the descending fibers of the pons and medulla. (8) Degeneration of the chief descending tracts of the spinal cord with degeneration of occasional fibers in ascending tracts, possibly aberrant descending fibers. (9) Slight, probably secondary cytoplasmic degeneration of the ganglion-cells of the anterior horns of the spinal cord. In brief, we are dealing with a diffuse nonsuppurative inflammation of the brain, most marked in the subcortical motor areas, with the resulting degeneration of those axis-cylinder processes which extend into the spinal cord and which have their origin in the involved portions of the cortex. Our examination has demonstrated clearly that the case is one of organic and not functional disorder, and the pathologic findings satisfactorily explain the symptomatology of the case. As to the origin of the disease, however, nothing is explained. From the character of the changes in the tissues and from the bacteriologic examination of the blood, we think that we are safe in assuming that the cause was not infection. The almost inevitable conclusion must be, unless some additional facts in regard to the case are discovered, that the lesions are of toxic origin. This toxin may perhaps have been of bacterial origin, for instance, it is stated that like conditions have resulted in influenza. It may have been of metabolic formation, or possibly some drug introduced in toxic doses. It had been noted that the patient was in the habit of taking various headache powders, and it is possible that these may have caused the cerebritis, though we have been unable to find any drugs, except alcohol and possibly morphin, which are recognized as inducing alterations like those found in this case. Experiments are now under way by means of which we hope to prove or disprove this possibility.

Gas-cavities in the Brain.—Emma W. Mooers² contributes a very

¹ Med. News, Aug. 8, 1903.

² Boston M. and S. Jour., March 26, 1903.

admirable article on the subject of gas-cavities in the brain and illustrates her specimens. The patient was a man of 49 who had been in an advanced stage of general paralysis of the insane. On the morning he died he showed a temperature of 104° and failed rapidly. The abdomen was intensely distended, gas being present in the cavity outside of the intestinal tract. At autopsy the brain showed the usual conditions found in general paresis. When placed in a formalin solution, it was found to float. Sections made 6 days later showed the characteristic Swiss cheese appearance (Plate 4). The cavities in the brain tissue were unlined, smooth, and clean-cut, and the tissue about these cavities presented no evidence of inflammatory reaction. The smaller cavities almost invariably contained many bacilli and some of them a dark pigment which did not give the iron reaction. They were also found free in the brain in clumps and singly. Only one kind of bacteria was found to be present. These conformed in size, shape, and appearance, and also in reaction signs to *Bacillus aerogenes capsulatus* of Welch. The case does not demonstrate whether the gas-cavities were of postmortem origin or may have started previous to death, as it has been shown that *Bacillus aerogenes* may invade the living organism, and in the case of Hartman¹ brain and cord symptoms existed some days before death, indicating early involvement of the brain, which presented similar gas-cavities.

Disease of the Brain-stem.—E. J. Rossolimo² makes a study of **thermoanesthesia and thermoanalgesia** as symptoms of a focal lesion of the brain-stem. He formulates his conclusions as follows: (1) A circumscribed lesion of the pons and the medulla may present dissociated forms of sensation, of the syringomyelia type. (2) Thermoanesthesia and thermoanalgesia may be present by disease of the brain-stem either completely one-sided, alternatingly crossed, or partially. (3) At the same time with dissociated sensation there may appear ataxia of the cerebellar type on the opposite side.

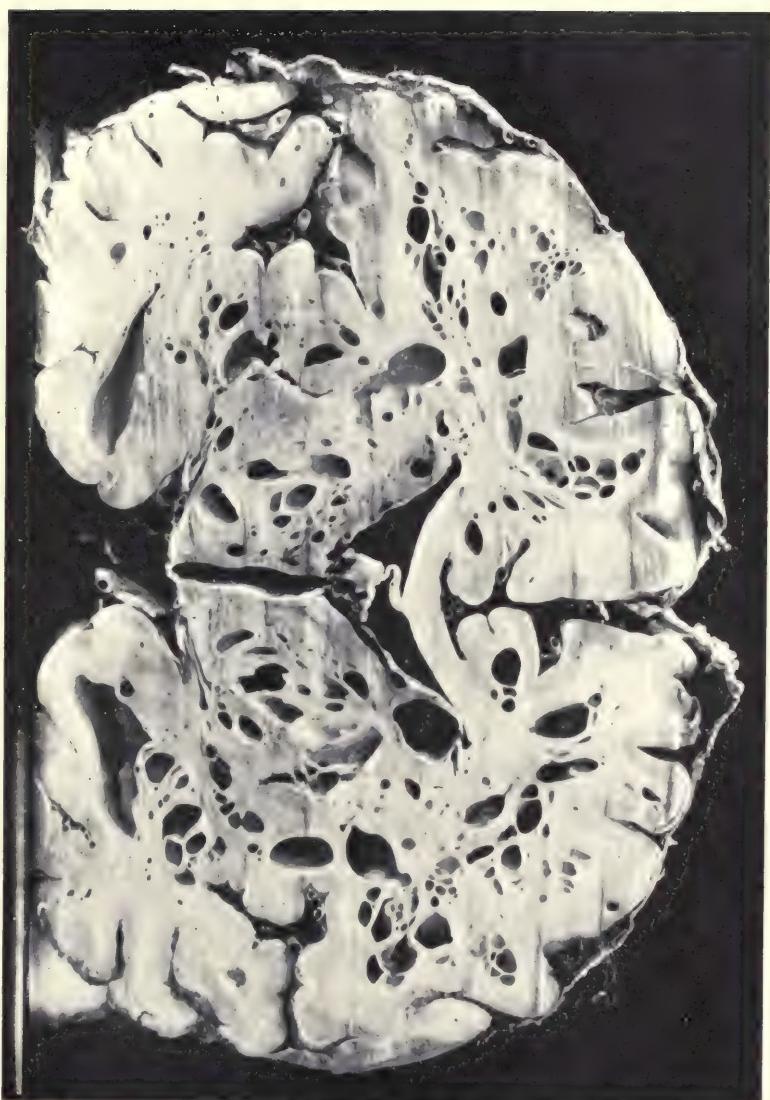
C. L. Dana³ furnishes a very complete article on the symptoms and diagnosis of cases of **softening of the pons and medulla**, with a report of 3 cases which came to autopsy. He also collects a number of cases from the literature. A study of the special symptoms of acute pons-medulla softening shows that hemiplegia occurred in a little more than half the cases; it is often more accentuated in the arm and leg, but usually in the arm. Occasionally with hemiplegia on one side there may be weakness on the opposite side, namely, on the side of the lesion. Hemiplegia with ocular palsy is commonly seen, while hemiplegia with crossed visual paralysis is rare, involvement of the fifth nerve being more frequent. Hemiplegia is usually accompanied with anesthesia on the same side as the paralysis. That is, in 16 cases it was on the same side and in 11 cases on the opposite side. The muscular sense is usually disturbed, but more commonly on the opposite side from the palsy, namely, on the side opposite the lesion. Convulsive movements are comparatively rare, in opposition to the Nothnagel idea that there is a convulsive center in the pons.

¹ Wien. klin. Woch., 1900.

² Deut. Zeit. f. Nervenheilk., March, 1903.

³ Med. Rec., Sept. 5, 1903.

PLATE 4.



Frontal section through brain (in front of the crura), showing numerous gas-cavities (Moers, in Boston Med. and Surg. Jour., March 26, 1903).

Forced laughter and crying have been noted in a few cases. Disturbance of the motor oculi nerves occurs in about one-fourth of the cases. He finds that the old formula that in cerebral lesions the eyes turn away from the paralysis and toward the lesion, while in pons disease it is reversed, is of very limited application. Pains referred to the parts supplied by the sensory tracts are rarely present. Hemianopsia is rare. Disturbance of swallowing is due to involvement of the swallowing center at the motor root of the vagus. Dysarthria was almost always present. Vertigo was common and distressing. Forced movements to one side, and usually the side of the lesion, occurred in lesions involving the restiform body. The reflexes are exaggerated if the motor tract is involved seriously, and in other cases are not much disturbed. The temperature is usually normal or slightly raised. The pulse may be slow, but is commonly weak and rapid. Respiration is not much disturbed. Paralysis of the sympathetic may occur, causing reduction of the palpebral fissure, retraction of the ocular globe, myosis, and skin redness on the side of the lesion. Sometimes a systolic blowing sound has been heard over the mastoid when there is arteriosclerosis of the vertebral artery with aneurysm. The left side is somewhat more frequently affected than the right. Softening affects the medulla and pons about equally. Pons and pons-medulla softenings are twice as frequent as medulla lesions alone.

Abscess of the Brain.—E. Gruening¹ reports a case of **abscess of the left sphenoidal lobe**. The symptoms leading to this diagnosis were rapid development of choked disc, slow pulse, intense headache, and vomiting; the localizing symptom of abscess being amnestic aphasia, and this was absent until after the operation. In the operation the discharge of pus from the abscess-cavity was followed by a flow of ventricular cerebrospinal fluid, in spite of which, however, the patient made a rapid recovery.

Multiple Sclerosis.—R. T. Williamson² contributes a **critical review** on the subject of **disseminated sclerosis**. He calls prominent attention to the probability that there is some irritating substance in the blood which stimulates the endothelium of the walls of the vessels and the perivascular spaces, causing extravasation of a toxic lymph into the surrounding nerve-tissue, resulting in degeneration of the myelin sheaths of the nerve-fibers. The usual presence of recent patches along with old ones at autopsy shows that the morbid agent persists in the organism for long periods of time. Examinations of the blood to detect corpuscular alterations and for microorganisms or protozoa have been negative. The author dwells upon the fact that the outline of the patches is more or less symmetric and not related to conduction tracts or vascular areas, reminding him of the patches produced by the infiltration of staining fluids. He concludes: (1) The possibility of the patches being caused by infiltration of the tissues with the toxic lymph passed through the walls of the lymphatics is worthy of attention. (2) There is a probability of the shape and outline of the patches being determined by physical conditions, since patches of similar form can be produced when staining fluids

¹ Med. Rec., Sept. 5, 1903.

² Med. Chron., Jan., 1903.

are allowed to infiltrate the cord. (3) There is a probability of a primary altered blood-condition to which the vascular change and the myelin change are secondary. (4) The front tap is present (generally on both sides) in about 40 % of individuals in ordinary health; in some it is very active. It follows that its presence alone, even if active, does not establish disease or indicate excessive irritability of the nervous system. (5) In organic disease the front tap is generally increased with the other reflexes in hypertonic, and decreased (generally wanting) in hypotonic states. (6) In the so-called functional disorders, hysteria, neurasthenia, and unclassified psychoses, we have found the front tap present in 71 % of cases. In epilepsy we have found it present in 75 % of cases. The test may therefore here prove of aid in combination with other findings, though its mere presence or activity is not of positive diagnostic value, nor does its absence negative the existence of neuropathic conditions. (7) Both these reflexes deserve to be placed upon the list of routine tests for the purpose of diagnosis. This is particularly true of the Achilles reflex, which is of the greater positive diagnostic value.

W. G. Spiller¹ reports 2 cases of **multiple sclerosis with autopsy**. He calls attention to the fact that multiple sclerosis is rare in America, so much so that Sachs in 1898 was able to find only one necropsy record of a case of this disease in America, the same thing being shown by the statistical records from neurologic clinics, where it averages about one case to a thousand. In the first case the causative relation to cold and dampness seemed to be clearly shown and the symptoms followed closely upon the exposure, which consisted in shoveling coal in the hold of a vessel when he was cold and damp. In the second case residence in a damp house was given etiologic weight. This case presented pronounced muscular atrophy, and there were secondary degenerations, which have been recorded by other observers, although they are rare. It appeared in the crossed pyramidal tracts, in the spinal cord, and below the mid-thoracic region.

Schupfer² has recently presented an interesting article on the appearance of **secondary degenerations** in multiple sclerosis, and finds that they occur, though rarely. In this case all the Achilles reflexes and those at the knee were lost, contrary to the almost invariable rule that the reflexes are always present and almost always exaggerated. [The case departs so widely from the type, and the lesions lack in some respects the distinctness of outline which is so characteristic of multiple sclerosis, that one might be disposed to classify the case as one of **disseminated myelitis**.]

Multiple Sarcomatosis of the Central Nervous System.—Spiller and Hendrickson³ report an interesting case of sarcomatosis of the central nervous system, a condition which has not received much attention in this country. The patient, a woman 21 years of age, presented no important family history. She had been well until she was married, at the age of 21 years, when she gave birth to a child after normal labor. There was no sore-throat, but her hair had previously fallen out. A few months

¹ Am. Jour. Med. Sci., Jan., 1903.

² Monat. f. Psychol., Aug., 1902.

³ Am. Jour. Med. Sci., July, 1903.

previously, 3 days after the child was born, she had a severe headache in the occipital region, an occasional sense of pressure on the head, the head felt giddy, and she saw everything double, was told she was cross-eyed. There was a shooting pain in the sternum. She was confined to bed for 13 weeks. The toes began first to be stiff, and the stiffness extended upward until she had no power below the waist. She lost the power to urinate voluntarily and also lost control over the bowel. There was marked swelling of the optic disks with hazy outlines and tortuous vessels. The lower limbs became completely paralyzed and the patient grew worse and died. An anatomic diagnosis of multiple tumors of the spinal cord, tumor of the cerebellum, congestion of the cord and brain, as well as congestion of the lungs, spleen, and kidneys, was made. Numerous small tumors were scattered throughout the pia of the cord, especially in the posterior portion, and one of the large intramedullary tumors of the cord was traced distinctly to the pia. A second case occurred in a woman of 42, who about a year before admission to the hospital noted failure of the eyesight and pain in the left occipital region. Six months later she had difficulty in walking and attacks of vertigo in which she would fall. She had 2 attacks of unconsciousness, without convulsions; also vomiting. There was labyrinthine involvement on the right side and on the left side deafness was intense. There was choked disc in the right eye and optic atrophy in the left. Both external recti muscles were paralyzed; there was tenderness over the left supraorbital and infraorbital foramen. An attempt to remove the cerebral tumor was unsuccessful. A tumor was found in each cerebello-pontile angle, but the larger one was on the left side. Tumors were found about the gasserian ganglion, pituitary body, floor of the fourth ventricle, right internal auditory meatus, and right jugular foramen, and numerous small tumors were found in the pia of the spinal cord. In a third case the patient was a man who had had pain in the lower thoracic region and girdle-sensation about 3 weeks before admission to the hospital. The pain persisted. The left lower limb became weak, and this was followed by weakness of the right lower limb. He had incontinence of urine and feces. He did not have pain in the lower limbs, but the latter became almost completely paralyzed and flaccid, and sensation was lost in these parts and in the trunk as high as a line passing about 2 inches below the nipples. The tendon-reflexes of the lower limbs were absent, but Babinski's reflex was obtained on each side. A primary sarcoma was found within the spinal cord just above the mid-thoracic region.

Cerebrospinal Fluid.—S. Schoenborn¹ presents an important article on the **cellular diagnosis** of the cerebrospinal fluid, especially in so-called parasyphilitic diseases. He first reviews the work of Raymond, Sicard, Vidal, and Ravaut, who contend that in all syphilitic and parasyphilitic diseases of the central nervous system the cerebrospinal fluid presents a more or less high grade of lymphocytosis. He quotes Sicard's statistics to the effect that in 17 cases of progressive paralysis there was uniformly lymphocytosis, the same in 6 cases of syphilitic myelomeningitis, and in

¹ Neurolog. Centralbl., July, 1903.

14 cases of tabes, as well as in 2 of 7 cases of multiple sclerosis. Also in 7 of 11 cases of herpes zoster. Lymphocytosis was absent in poliomyelitis, syringomyelia, late hemiplegias, polyneuritis and other peripheral disorders, and in functional nervous diseases, in Friedreich's ataxia, compression myelitis. Altogether, 134 cases were examined by Sicard. In the Heidelberg clinic, under the direction of Professor Erb, the deductions of the French author have been established, but further investigation is deemed important.

The Cortical Writing-center.—H. C. Gordinier¹ reports a case in which the lesion was limited to the second frontal convolution, and the patient presented a distinct **agraphia** without other aphasic concomitant, which seems to prove a separate and distinct cortical center for writing, having the same relation to writing movements that the motor speech-center has to speech movements. This center is situated at the base of the second left frontal convolution for the right-handed, and probably the same location in the right hemisphere for the left-handed. Destruction of this center produces pure motor agraphia without aphasia or paralysis of either arm.

Brain Tumor.—T. Oliver² reports further upon a case of cerebral brain-tumor in which operation had been done 8½ years before. The original report appeared in the Brit. Med. Jour., Nov. 20, 1898, and elsewhere. An angioma was removed from the motor areas of the left side of the brain on Nov. 14, 1894. At present the patient presents a remarkably good state of health, being stout and cheerful. It was several months after the operation before she could utter the words father and mother, but gradually she gained speech and now has no difficulty. For the last 6 years she has written with the left hand. There was slight paresis of the lower half of the right face. She walked well, but dragged and swung the right foot. She could lift and carry with the right hand such things as a moderately full kettle, but did not attempt with this hand to place it over the fire. There was a well-marked knee-jerk, but ankle-clonus was not to be obtained. The limbs on the right side were less employed than formerly, but showed very slight loss of contour and size. Her eyesight was good; the discs were pale, but the borders were well defined and even. No complaint of headache was made, although there was some tenderness over the operation-point. She had had no convulsive seizures. There was considerable loss of power in the right hand and forearm, especially the smaller muscles concerned in the finer movements. The fingers were firmly flexed upon the palm, but this was attributable to changes occurring before operation and due to the tumor. The report is of value as showing the continuous condition of comparatively fair health after an operation for brain tumor on a patient who was completely hemiplegic at the time with marked choked discs and other evidences of tumor.

M. A. Starr³ reports upon the results of **surgical treatment of brain**

¹ Am. Jour. Med. Sci., Sept., 1903. ² Brit. Med. Jour., July 11, 1903.

³ Jour. Nerv. and Ment. Dis., July, 1903.

tumor. He has been able to collect 365 cases up to January 1, 1903, which are tabulated as follows:

TABLE OF RESULTS OF OPERATION FOR BRAIN TUMOR.

	Cere- bral.	Cere- bellar.
Total number of cases operated upon.....	365	315 50
Cases in which the tumor was not found.....	111	91 20
Cases in which the tumor was found but not removed.....	27	21 6
Cases in which the tumor was removed and the patient died	59	51 8
Cases in which the tumor was removed and the patient recovered	168	152 16

He says: "The accuracy of diagnosis and the accuracy of localization of tumor are to-day more easily possible than before. Given a history of a slowly progressing disease with symptoms of headache, vomiting, vertigo, sensations of cerebral discomfort, progressive emaciation and feebleness, and a gradual loss of sight due to a choked disc, and the only probable hypothesis is the existence of a brain tumor. No other disease can produce this particular combination of symptoms. Hence the diagnosis of the nature of this disease is not difficult. The possibility of locating tumors has also become more definite within the last 20 years. This diagnosis is wholly by direct observation of local symptoms such as (*a*) mental symptoms, (*b*) motor or sensory aphasia, (*c*) local spasm and monoplegia, (*d*) hemianopsia, (*e*) cerebellar staggering. The diagnosis is also one to be reached in part by elimination, for the absence of any one of these localizing symptoms just named, when the disease is clearly a brain tumor, makes it evident that the tumor is inaccessible. It is therefore possible at the present time to determine with considerable accuracy, first, that a tumor is present, and, second, that the surgeon can reach it. The chance of success has also been materially increased by the newer surgical methods of access to the brain." He also thinks that the operation for cerebellar tumor is one of great difficulty and danger. He has determined by measurements of the cadaver that the surgeon can reach only one-tenth of each cerebellar hemisphere, and this surface is only rarely the seat of tumor, which ordinarily lies either in the middle lobe or in the sulci between the cerebellum, the pons, and the medulla oblongata, where they are inaccessible. The causes of failure in operation upon cases of brain tumor are: "First, mistakes in the diagnosis of the location of the tumor. In a certain percentage of tumors these mistakes are inevitable. Certain local symptoms of tumor which appear to point to a clear localization do occur in some cases when the tumor is at a considerable distance from the point where it is supposed to lie. The local symptoms are therefore not infallible in their indication. Second, some tumors, even when accessible, cannot be removed. They are infiltrating gliomas without any boundary and with a vascular, softened tissue about them which prevents enucleation, and this variety of tumor is particularly liable to return even if removed in part. Third, the dangers of hemorrhage and the dangers of meningitis are less dreaded at present than formerly, proper asepsis preventing the latter complication in all cases."

Cerebellar Disease.—F. E. Batten¹ contributes an interesting article on the **diagnostic value of position of the head** in cases of cerebellar disease. He summarizes as follows: (1) A definite attitude of the head is not infrequently seen in cases of cerebellar disease in man, that position being with the ear approximated to the shoulders on the side opposite the lesion, and with the face turned up to the side of the lesion. (2) The position of the head, so far as the approximation of the ear to the shoulder is concerned, is the reverse, while the position of the face is the same as that seen after experimental ablation of one lobe of the cerebellum. To answer the second portion of the question—viz., Can the sign be used as a symptom of diagnostic value?—in the bare affirmative might lead to error, for the relative value of the symptom in comparison with the other symptoms of a cerebellar lesion, is a question which needs most careful consideration in each individual case. It is probably a symptom of less importance than incoordination or weakness. (3) The fact that the position is sometimes present in cases in which there is no gross lesion of the cerebellum is further reason for not attaching too great importance to the position assumed by the head. In conclusion, it may be said that as an additional and confirmatory sign of cerebellar tumor, the position assumed by the head is of value, but too much importance should not be attached to its presence alone, or when apposed to symptoms which have been shown to possess greater diagnostic value.

W. H. Hudson² reports 2 cases of **tumor of the cerebellum accurately located** and subjected to operation. In the first case a cyst of the cerebellum was located in the right lobe and 2 operations were performed, with ultimate recovery. In the second case there was a tumor of the cerebellum, accurately located well forward in the right lobe, successfully removed. There was apparent operation recovery, but death occurred on the third day due to exhaustion from diarrhea.

NEUROSES DUE TO INFECTION.

Tetanus.—A. Krokiewicz³ reports the statistics of all cases treated by the **subcutaneous injection of brain emulsion**, 16 in number, of which 13 terminated in recovery and 3 were fatal. The author believes the showing would have been more favorable if the injections had been used in the beginning of the disease. In 3 cases under treatment the disease showed great intensity, and in all cases previous treatment with pharmaceutic preparations had been without any good result. The number of injections was 6, and they were made daily or at intervals of several days, and were well borne, the abscess healing rapidly after incision. The brain-substance used was prepared by making an emulsion of rabbit's brains, and the treatment is based upon the well-known tendency of the toxin of tetanus to become incorporated in the nerve structures and thereby fixed.

¹ Brain, Spring, 1903.

² Am. Jour. Med. Sci., Sept., 1903.

³ Klin. therap. Woch. (Vienna), Feb. 8, 1903.

Marie and Morax¹ have investigated the **propagation of tetanus toxin** from the point of inoculation to the central nervous apparatus. Wassermann showed that if a small quantity of cerebral matter is introduced into a solution of tetanin it absorbs the poison and the remaining fluid becomes inoffensive. Marie and Morax demonstrated that there is an affinity between tetanin and the axis-cylinders of the peripheral nerves, although this is not shown in the tetanin experiments and appears to depend upon the maintenance of the natural connection of the nerve-trunks with the intramuscular endings. Injected into a muscle, the toxin is distributed by the lymph and passes in part into the blood, where its presence is soon evident. In the inoculation zone the lymph comes in contact with the nerve expansions and the motor and vasomotor nerves absorb it to a much greater degree than other tissues. Diffusion then takes place centripetally, and for 24 hours the local nerve-filaments are more highly saturated than the nerve-elements elsewhere in the body. When a sufficient quantity of toxin has been absorbed to affect the proximal portion of the neuron, generally tetanus is developed; usually, however, preceded by a local tetanus due to the earlier saturation of the terminal nervous structure. When toxin is introduced directly into the blood or viscera, symptoms do not appear until the motor neurons have withdrawn the toxins from the circulating blood and all are saturated. This explains the delayed onset and generalized symptoms in splanchnic tetanus.

G. W. Norris² presents a study of tetanus based upon 57 cases taken from the records of the Pennsylvania Hospital between January, 1874, and January, 1903, and contends as follows: In the light of recent investigations several facts should be remembered in the treatment of tetanus: (1) Tetanus toxin is found mainly in the nervous tissues; once united with these, antitoxin is powerless in its action on already affected cells. (2) Antitoxin is harmless, but deteriorates rapidly; therefore, it should be procured fresh, and administered in continuous and large doses with the hope of immunizing the intact nerve-cells. (3) All cases of wounds in which there is a possibility of tetanic infection, should receive prophylactic injections of antitoxin. (4) Local treatment is of great importance, hence the infected area should be excised; when this is impossible, extensive disinfection, preferably with carbolic acid, should be carried out; furthermore, as Behring has shown, antitoxin is of benefit locally as well as systematically. (5) Every effort should be made to maintain the nutrition of the patient, for Castronuovo has demonstrated that antitoxin is of no value in tetanic animals which have been starved.

Chorea.—C. Wall and H. R. Andrews³ discuss the **chorea of pregnancy** and give a detailed account of 40 cases occurring in 37 women. They believe that the cases were truly choreic in character and indistinguishable from the ordinary Sydenham chorea. They point out that a woman's power of emotional control is diminished in pregnancy and tends to revert to that of childhood, and the incidence of a disease confined

¹ Ann. de l'Inst. Pasteur, Nov. 25, 1902.

² Phila. Med. Jour., May 16, 1903.

³ Jour. of Obstet. and Gynæc. of the Brit. Empire, June, 1903.

to childhood is thus explained. In 16 of the 37 cases there was a previous history of rheumatism; 23 had suffered from chorea previously. The cause of chorea often seemed to be worry, such as that from illegitimacy, dread of increasing a large family, or sudden shock. Of the 40 cases, 5 ended fatally; 2 spontaneously aborted, and in 3 premature labor or abortion was induced. Both of the spontaneously aborted and the 2 in whom labor was prematurely produced died. The number, 5 %, spontaneously aborting is lower than the average of normal pregnancies, which is about 16 %. The mortality connected with the induction of labor in these cases rendered this procedure undesirable, and it has been discontinued at the London Hospital since 1895. Treatment consists in sleep and quiet, and especially good nursing and food. Opium and bromid are both dangerous if given in doses large enough to be effectual. The most satisfactory hypnotics are chloral hydrate and chloralamid in small doses, infrequently repeated. Alcohol is more desirable than arsenic, but should not be combined with arsenic. Under such treatment the prognosis is considered good, both as regards life and the natural termination of labor.

TROPHONEUROSES.

Exophthalmic Goiter.—J. N. Hyde and E. L. McEwen¹ contribute an article on the **dermatoses occurring in exophthalmic goiter**, with reports of cases. They cite instances of hydrocystoma, telangiectasis, pruritus, and angioneurotic edema. Upon review of the literature they insist that it is clear that important lesions of the skin involving serious structural changes in the corium and subcutaneous tissue may coexist with exophthalmic goiter. This dictum is based upon 111 reports, including about 49 cases of hyperhidrosis, 15 of pigmentary changes and myxedema, 14 of simple edema, 5 of scleroderma, generalized or circumscribed, alopecia, vitiligo, telangiectasis, purpura, urticaria, erythema, and one only of hydrocystoma. Among the accidents of the same morbid process, most of them evidently rare, are hemorrhage from the skin, bronzing of the integument, eczematous and erysipelatous accidents, and localized anesthesia.

Barret² has collected 42 cases of **exophthalmic goiter in children** below the age of 15, the youngest being 4½ years old. The symptomatology does not differ much from that presented by adults, although there seems to be a tendency to a lessened amount of exophthalmus and tremor is less pronounced, though chorea frequently attends the disorder and there is great irritability of disposition. The duration of the disease is not so long as in adults, 2 to 3 years being about the limit, and recovery is more frequent.

R. L. Jones³ calls attention to the **association of Graves's disease with rheumatoid arthritis**. He tabulates 6 cases of larval Graves's disease in rheumatoid arthritis and 14 cases of well-marked rheumatoid

¹ Am. Jour. Med. Sci., June, 1903.

² Jour. de Med. et de Chir. Prat., July 10, 1902.

³ Brit. Med. Jour., May 2, 1903.

arthritis showing in addition marked symptoms of Graves's disease. He has observed a periodic increase in the thyroid enlargement co-ordinate with the articular swellings. Whether the relation is intimate or not further inquiry must determine.

Tedeschi¹ sought experimentally to produce exophthalmic goiter, which he contends may be induced with all its symptoms in dogs by **lesions of the anterior portion of the restiform bodies.** He concludes that exophthalmic goiter is due to some anatomic or functional lesion of the restiform bodies, probably connected with the vagus or sympathetic or with the vasomotor center. This bulbar alteration is followed first by hyperemia, then by a hypersecretion of the thyroid gland, and this in turn produces other symptoms, including the greater part of the changes of metabolism. He claims to have proved that the thyroid secretion exercises a special tonic influence on the bulbar centers similar to that of cocaine, pilocarpin, and apomorphin. Thus a vicious circle is established and the disorder is maintained or accentuated.

Angioneurotic Erythema.—J. C. Bloodgood² reports a case of angioneurotic erythema treated surgically by neurectomy. In this condition the areas of erythema differ from the edema of the usual angioneurotic variety described by Quincke, presenting a persistent vasomotor dilation. Associated with this there is increased sensibility to touch and decreased sensibility to pain, sensations of heat and cold not being disturbed. The areas on the cheek are much more painful and tender than the areas on the abdomen. In all the areas the erythema could be made to disappear by continuous pressure, but immediately reappeared when pressure was discontinued, and the central portion was always of a dark red color, the redness becoming lighter toward the periphery. The border of the reddened area is not sharply defined, but there is a zone composed of small patches of erythema and normal skin. The edema is slight and the swelling can probably be explained by the increased amount of blood rather than by the actual exudate. At the operation no evidence of extravasation of blood was present, such as is found in purpura hemorrhagica. The condition may be likened to localized intense blushing and explained by vasomotor disturbances, peripheral and central. A patient presenting this condition, under cocaine-infiltration had an incision made through the skin and subcutaneous tissue on the outer side of the area dividing everything down to the aponeurosis of the muscle, the area being located on the left side of the abdomen on the nipple side at the eighth rib. The erythema immediately disappeared and had remained absent for 6 months at the time the report was made. The same patient previously had undergone neurectomy of the infraorbital nerve for a similar condition of the cheek. A second case, in which there was angioneurotic edema of the mastoid, was subjected, under cocaine, to an incision over the mastoid, and the edema and erythema disappeared. All the tissues were found normal except a slightly enlarged and hyperemic lymphatic gland, and the veins

¹ Giorn. di R. Acad. di Med. di Torino, Feb.-March, 1903.

² Johns Hopkins Hosp. Bull., May, 1903.

seemed larger than usual. The patient was free from discomfort for about 3 weeks, after which, however, she had intermittent attacks. In another case of angioneurotic edema of the ankle-joint an operation was performed, but with indifferent success. [Consideration of the second and third instances cited by the author would make the diagnosis of angioneurotic edema open to doubt, as the persistence of edema is contrary to the rule. The association, however, of erythema with angioneurotic edema is occasionally seen, and by personal communication I have learned of 3 cases besides one which I observed.]

Akromegaly.—D. L. Edsall and C. W. Miller¹ reported to the Pathological Society of Philadelphia in regard to the **calcium, phosphorus, and nitrogen metabolism in akromegaly**. Their report was based on 2 cases in which striking abnormalities were found in metabolism. There was a decided tendency to the retention of nitrogen, phosphorus, and calcium, and they draw the conclusion that if the disease was confined to the bones, the calcium retention would be more pronounced than that of the other ingredients, but as they were equally retained, they conclude that the disease must be recognized as one of the general organism, and believe that the overgrowth of the nervous system which accompanies the bone-changes is in all probability abnormal in quality. The amounts of calcium excreted by the kidney and bowel were greatly changed from those in normal persons. The amount excreted by the kidney, instead of being one-eighth to one-tenth that from the bowel, was nearly equal, and this was not dependent upon the diet, as shown by proper tests, but seems to be a part of akromegaly when the disease is progressing, and hence of some diagnostic and prognostic value. The experiments also point to the fact that the growth of bone is abnormal, and the disease may be in the nature of a changed general metabolism, the bone-changes being merely a part of the general involvement.

Adiposis Dolorosa.—F. X. Dercum² reports a case of this dystrophic disorder associated with **involvement of the joints**. Such complications are rare, but have been reported in one other case. A skiagraph in Dr. Dercum's case revealed no lesion of articular surface, though the knee-cap was thickened. There was a general chronic arthritis of both knees.

MOTOR NEUROSES.

Paramyoclonus Multiplex.—J. R. Hunt,³ after considering the varieties of involuntary muscular contractions which have been called paramyoclonus multiplex, concludes: (1) The term paramyoclonus multiplex, or myoclonus multiplex, should be reserved for that form of myospasm characterized by multiple, spontaneous, isolated contractions of individual muscles. (2) This type is peculiar and distinctive, and receives its most logical explanation in a disturbance of the spinal centers. (3) This type should be carefully separated from the cerebral type of the myospasms which are characterized by movements of a more or less

¹ Med. News, June 13, 1903.

² Phila. Med. Jour., Dec. 20, 1902.

³ Jour. Nerv. and Ment. Dis., July, 1903.

coordinated type, as are observed in the maladie du tic, tic convulsif, and the convulsive tremor of Pritchard and Hammond. (4) The contractions of paramyoclonus multiplex are closely related to the myokymia and fibrillary contractions. (5) Paramyoclonus multiplex may occur as an idiopathic or a deuteropathic affection, in the latter complicating various organic and functional diseases of cerebral and spinal origin. He then presents a report of a case which he classifies as essentially paramyoclonus multiplex. Examination of the spinal cord was negative. The nervous system was found to be entirely normal. The muscle-fibers, on the other hand, while maintaining normal structure, were extremely hypertrophied. There was a sarcolemma nuclei between the sarcous elements. Such changes have been mentioned in cases of myotonia congenita and the hypertrophic stages of dystrophies.

C. L. Dana¹ reports a number of cases of myoclonus and attempts a classification. The cases reported illustrate: (1) Myoclonia of the spinal and peripheral type, including myokymia, fibrillary myoclonus of Kny, and Friedreich's paramyoclonus multiplex. (2) Myoclonia of functional and hysterical type. (3) Myoclonia of the convulsive tic type. (4) Myoclonia of degenerative chorea and epilepsy. (Myoclonus-epilepsy, myoclonia of family type.) He finally makes 5 groups of myoclonia, as follows: (I) Paramyoclonus multiplex, of Friedreich; astasic myoclonia, of Vanlair; multiple spinal myoclonus, of Lowenfeld; fibrillary chorea, of Morvan; fibrillary myoclonus, of Kny. (II) Functional, or hysterical myoclonus multiplex, chorea major, chorea electrica, of Henoch. (III) Myospasmia; memory-spasms, of Friedreich; habit chorea; chorea variable des dégénérés; convulsive, or spasmodic tic; tic general; Tourette's disease, myriadrit; palmus; tic neurosis, of Collins. (IV) Degenerative chorea, hereditary chorea, Huntingdon's chorea; myoclonus-epilepsy; myoclonus, of Unverricht, of "familial" type; myoclonia congenita of Seeligmüller (?); hereditary degenerative chorea of Sachs. (V) Infectious chorea, chorea minor, Sydenham's chorea; chorea electrica of Dubini (?); chorea electrica of Bergeron; senile chorea of Gowers (?). The astasic myoclonia of Vanlair is apparently a myoid tumor.

PSYCHONEUROSES.

Epilepsy.—L. P. Clark and T. P. Prout² express their views in regard to the **changes of the cortical cells** in epilepsy, with their significance and clinical interpretation. They have found, in tissues taken shortly after death and placed at once in absolute alcohol, that the condition of the cells of the cortex, especially those of the second layer and other cells of the type, was strikingly modified and differed only in degree in several cases of epilepsy. They were swollen, some almost ballooning out to twice the normal size. The chromatic substance was almost entirely gone, nothing but a bare framework remaining of the body of the cell itself; the nucleus was often swollen out of proportion to the swollen cell-

¹ Jour. Nerv. and Ment. Dis., Aug., 1903.

² Boston M. and S. Jour., April 23, 1903.

body. In the majority of instances the outline of the nucleus was difficult to define, all traces of the nuclear membrane having disappeared. The nucleus itself presented a finely granular appearance, and in very many instances the nucleolus had been abstracted from the nucleus by the knife in making the section. This is brought about by the destruction of the intranuclear network, giving the nucleus its granular appearance and rendering the nucleolus a loose body within the nucleus, so that it is readily abstracted from it in the process of section-making. It was a very frequent occurrence, especially in the status cases, in which condition the lesion was most pronounced; for example, in the last case of status examined, over 120 examples of nucleolar abstraction were found in going over 1 sq. cm. of surface in a single slide. The importance of this artefact will perhaps be better appreciated if it is stated that in examining through every portion of 32 slides of normal brain tissue this artefact occurred but 6 times. They believe these facts point to a destruction and ultimate disappearance of the cell as a unit in the cerebral cortex. The involvement of the nucleus in a process which produces such vital changes in its structure is of most serious import. They do not wish to be understood as interpreting these lesions as representing the final pathology of epilepsy. The conditions found in these cases indicate cell-death, and teach something as to the manner of its occurrence. The real pathogenesis of epilepsy, however, is to be sought, first, in those hereditary and acquired conditions which produce an unstable nervous organism, and, second, in those products of faulty metabolism comprised in the various toxic and autotoxic agents which act as excitants to a poorly developed nervous system. Probably the most practical lesson to be drawn from the study is that epilepsy is a diffuse lesion of the entire cortex. Finally, they think we have in this study adequate evidence for the present empirical treatment of the disease in which the individual is given first attention. This consists, largely, in overcoming hereditary tendencies and exclude toxic and autotoxic agents, in giving the patient a thoroughly detailed plan of diet, exercise, recreation, baths and sedatives comprised in the administration of bromids. In the light of the pathogenesis, the histopathologic changes and their sequence, which result in more or less prominent impairment of normal cerebral functions, the importance of the earliest treatment is obvious; the disease is also too profound in its changes for anything less than the most comprehensive attention.

R. Pugh¹ presents an important article on the study of the blood and certain blood-changes in idiopathic epilepsy. His conclusions are as follows: (1) The alkalinity of the blood in the interparoxysmal period is lower than the average of the control cases. (2) The diminution is gradual and progressive, and is more marked in those cases suffering from gastric catarrh and constipation. (3) There is a marked sudden and pronounced fall immediately prior to the onset of the fit. (4) There is a further fall in the alkalinity after the fit is over; this diminution is seen from 3 to 10 minutes after the attack. (5) This after-diminution

¹ Brain, Winter, 1902.

depends upon the duration and severity of the muscular twitching, and upon the degree of the alkalinity in the interparoxysmal period. (6) There is a gradual return of the blood to its normal alkalinity, which takes place in 5 to 6 hours, the rise being more marked in the first hour. (7) If the alkalinity keeps at a low value, it may determine the onset of another fit. (8) The diminution after the fit is due to the chemic end-products of muscular metabolism, *i. e.*, sarcolactic and carbonic acids, and not to substances in direct relation to the epilepsy. (9) The diminution after a nocturnal fit takes a longer time to return to the normal than the diminution after a day fit. (10) It is impossible to elevate and maintain the alkalinity within physiologic limits for any appreciable length of time by the administration of drugs. (11) There is a leukocytosis after a fit. The increase is due to the small hyaline cells; also to a less extent to the large hyaline cells. The polymorphonuclear cells are diminished. There is an increase in the eosinophile cells some hours after the attack. (12) The leukocytosis is not so pronounced in status epilepticus; it diminishes with each seizure.

W. Tschisch¹ takes under consideration the **larval form**. He calls particular attention to a peculiar **metallic gloss of the epileptic's eye** which differs from that of all others and is peculiar to itself. He realizes the difficulty of properly describing this condition, but says when once recognized it can readily be seen. He thinks that it is due to the peculiar poisoning of the system, and that this same intoxication causes the fits as well. The usual enlargement of the pupils may be due to the same poison. He thinks strength is added to this contention by the fact that after a fit the metallic gloss of the eye is temporarily lost and disappears in proportion to the severity of the fit.

Bellisari² reports some cases supporting the view that **paroxysmal tachycardia** may be of an epileptic character, similar to periodic attacks of angina, vomiting, gastric crises, etc. The attack may have an aura similar to the epileptic aura. Some cases have shown slight pyrexia during the attack. There is nothing to distinguish the rapid heart which is the equivalent of an epileptic seizure from so-called essential tachycardia, the diagnosis being dependent apparently on the history, the nocturnal character of the onset, the nature of the antecedent and subsequent phenomena, and the influence of bromid, in the absence of the ordinary causes of rapid heart.

L. P. Clark,³ in regard to the **daily rhythm** of epilepsy as an interpretation, recognizes the existence of such rhythm, and says: "To recognize the existence in general terms of a daily rhythm in epilepsy is of practical importance for obvious reasons, and especially to those with whom the patient is immediately entrusted; particularly for guarding against accidents and injuries at those periods of greatest liability for attacks. This suggestion has most value for epileptics without known periods of liability to attacks. The agents that are employed to arrest or delay attacks are as much of our common experience as are their general inutility

¹ Jour. Ment. Pathol., Nos. 1, 2, 3, vol. iv. ² Rif. Med., March 11, 1903.

³ Med. News, July 18, 1903.

when indiscriminately used even when a sufficiently prolonged aura presents itself. We must, therefore, continue to insist upon a broad, comprehensive, carefully detailed, continuous plan of treatment, however empirical at present it may seem to be. To summarize: This study of 150,000 seizures shows that there is a more or less definite daily rhythm in the epilepsies, in the early evening, noontime, and in the early morning, which roughly divides the 24 hours of the day into 8-hour periods. There are also smaller or secondary rhythms. The interpretation of the rhythm is explained on the basis of cerebral fatigue and the accumulation of waste products at these periods which produce autointoxication and which in turn exhibits itself in seizures during light sleep and during the day, when the loss of cerebral inhibition is greatest. Secondary and contributing factors are: manner of living, diet, exercise, occupation, sedatives, and the character of the epilepsy."

W. P. Spratling,¹ in a close analysis of 815 males and 510 females suffering from epilepsy, found that 319 males and 186 females had a **sensory aura of some kind**. In his experience it is found that the more sudden, severe, and complete the epileptic attack, the less likely is it to be preceded by the aura; while the further the convulsion is from the classic type, the more common and distinct the aura. He thinks a more careful study of this initial phenomena may contribute possible guidance to the seat of the disease.

A. Meyer,² in regard to the **pathology** of epilepsy, draws the following conclusions: (1) The frequency of nervous lesions in epileptics is difficult to establish. The ordinary examination is too open to oversights, and must be very systematic in order to justify the verdict of negative findings. The great variation in the number of sclerosed cornu ammonis, diffuse gliosis, small foci of softening quoted by various authors, is certainly to a large extent an expression of variable attention, a picture of the psychology of investigators rather than of the distribution of facts. (2) Concerning the chemical investigations, the same psychologic factor of personal interest is even more deleterious to a fair comprehension of the facts. The truism that observation of the rules of hygiene in every direction is a great factor in the management of epilepsy is decomposed into innumerable currents of interests. Nothing short of unprejudiced and complete series of investigation will help us here, and also a much greater conservatism with complicated methods, such as the tests of toxicity, the results of therapeutics, etc. (3) All these conditions are difficult to attain except in sufficiently equipped institutions, for which funds should be made available by the State, and by scientific corporations, so that they may work free of the need of sensational results, create a sound basis in clinical work, and systematize the investigation according to methods which can be admitted as safe and fruitful.

R. Balint,³ in regard to the **dietetic treatment** of epilepsy, contends that its careful consideration is one of the most important features in the management of the disease. He thinks that a diet of milk, butter,

¹ Med. News, July 18, 1903.

² Med. News, July 18, 1903.

³ Neurolog. Centralbl., April 16, 1903.

eggs, vegetables, and bread salted with sodium bromid gives better results than any other combination. Ordinary salt is left out of the food or is substituted with sodium bromid. During this treatment his patients appeared to be better, and this was particularly true of children, than when bromid was administered in the ordinary manner with the usual diet.

MENTAL DISEASES.

Paretic Dementia.—Devay¹ believes that by intensive specific medication, which he has carried out since 1896 in 42 cases of general paralysis, results sufficiently satisfactory have been obtained to discredit Fournier's theory of parasyphilitic diseases, and the idea that mercury and iodid in these cases are sometimes harmful. In 19 cases the treatment was without result, though 12 of the 19 were certainly syphilitic. The 23 cases in which he obtained benefit from the treatment he divides into 4 groups: (1) In the first 3 cases, with diminution or disappearance of the physical signs of paretic dementia there was but slight modification of the intellectual trouble. (2) Five cases in which the body signs diminished or disappeared and delirium subsided but intelligence remained enfeebled. (3) Five patients regained memory and intelligence, but some of the physical signs remained. (4) Ten patients were cured for a time, mental and physical signs completely disappearing. In 3 of these cases after a remission of some months death followed apoplexy. Treatment consisted of doses of calomel and potassium iodid. Over 90 % of the cases showing great benefit were undoubtedly syphilitic. As a result of the treatment the mental symptoms, the delirium and expansiveness were the first to disappear, then the memory, attention, and mental faculties showed signs of returning. On the physical side fibrillary tremor first improved, the inequality of the pupils remaining almost invariably persistent.

Lemoine² refers to the usually unfavorable views in regard to the treatment of tabes and general paresis, and reports 6 cases of each disease, indicating that the pessimistic view should be revised, especially as regards paresis. These cases were treated by hypodermatic injections of benzoate of mercury in daily doses of 3 cg., and marked amelioration was noted. In the case of paresis the treatment was continued for periods of 15 days with equal intervals of non-treatment, and this alternating course was carried out for periods of 3 months to a year. Improvement in general paresis consisted in restoration of speech, recovery of memory, reestablishment of coordination, and abolition of tremors. Some degree of mental enfeeblement persisted in all cases, but the physical and mental improvement was marked and striking. In the 6 cases of tabes the improvement could only be described as slight.

Pierret³ reports a case of spontaneous remission of tabetic general paralysis, and believes that this fact must modify the claims of those

¹ Lyon Med., Feb. 15 and 22, 1903.

² Rev. Neurolog., July, 1902.

³ Lyon Med., Dec., 1902.

who think that the use of mercury or other remedies may serve to control paretic dementia in tabes.

Amaurotic Family Idiocy.—B. Sachs,¹ who has contributed so much to this subject, and was practically the first to clinically and histologically outline the disorder, which might well be called Sachs's disease, contributes another interesting article on the subject, with reports of pathologic work. The case which furnished the brain was typical, and serial sections were made. Careful study shows differentiation in the development of the cerebral white fibers and also degeneration of the pyramidal tracts in the lateral and anterior columns of the cord. The same degeneration can be traced upward as far as the medulla. A more important change is the variations shown in the gray matter of the central nervous system, which are practically the same in the cortex, the cranial nerve-nuclei, and the gray matter of the spinal cord throughout its entire length. These changes are those which were described by Hirsch and originally reported by the author. In his first and second reported cases there was some decrease in the neuroglia cells, but the chief and most remarkable change was in the larger ganglion-cells, especially the entire cerebrospinal system. The cell-body is completely altered, the entire cell-protoplasm disintegrated, furnishing a homogeneous mass, the nucleus shifted to some part of the periphery and very slightly differentiated from the rest of the cell-body. The nucleus is often entirely wanting, and in many cases the cell-body was completely disintegrated, so that it was recognized with the greatest difficulty. In 1887 the author spoke of these changes as representing an agenetic condition pure and simple, while Kingdon, Russell, and Hirsch have laid stress upon the degenerative character of the disease. The author still contends now, as in former years, that degeneration will set in whenever growth is arrested, so that the statement is one of terms and not of conditions. To this extent, therefore, the disease is a congenital affair, normal development ceases, and degeneration sets in.

Fragility of the Bones in the Insane.—W. M. Smith,² in a study of this condition, believes that a **peculiarity in the bones of the insane** is due largely to disturbance of the trophic influence possessed by the ganglia of the posterior spinal nerves. In 3 cases of general paralysis, 1 case of melancholia, and 1 of Huntingdon's chorea, Weigert-Pal's method showed well-marked nerve-fiber degeneration and extensive alterations in the ganglia itself. From these investigations he concludes that there are well-marked evidences of gross lesions in the posterior ganglia, the sensory roots, and peripheral nerves, with a probability that the lesions in the mixed nerves are due to degeneration of the sensory fibers. He also calls attention to the fact that pain on fracture is so infrequently complained of in these cases that it lends considerable weight to the supposition that the process is dependent upon changes in the sensory tracts.

The Treatment of Insanity.—A. V. Johnson and E. Goodall³ report

¹ Jour. Nerv. and Ment. Dis., Jan., 1902.

² Brit. Med. Jour., Oct. 3, 1903.

³ Brit. Med. Jour., Oct. 3, 1903.

in a preliminary manner upon the **action of the blood-serum** taken in cases of mental disease upon cultures of *Bacillus coli*. They take it for accepted that mental states are influenced by the condition of the digestive tract, and base their experimental investigations upon the evidence brought forward by Smith and others, showing that the growth of bacteria in the intestine normally kept within bounds by inhibitive powers exercised by the intestinal walls may become abnormally changed by conditions which impair this control, and this inhibitory power is weakest in the large intestine. Normal inhibition is interfered with very probably in the reduced health which is commonly associated with mental disorders, and under these circumstances an excessive growth of *Bacillus coli* can be looked for and toxic effects are to be expected from the uncontrolled proliferation of the organism. They found that the bacilli were agglutinated in 60 % of all cases, including all varieties of insanity, while control tests made at the same time of healthy individuals showed no clumping of the bacilli. The greatest number of agglutinations occurred in cultures of the virulent *Bacillus coli* with a dilution of 1 to 100.

The Prefrontal Lobes and the Mental Function.—C. W. Burr¹ in discussing this subject points out that writers have neglected the cause of mental symptoms in cases presenting disease of other parts of the prefrontal area, and insists that the area of brain cortex that can be excluded from all mental processes is not large, including, as it does, both sensory and motor zones, half-vision centers, speech-centers in Broca's convolution, and the center of common sensation, which is not yet fixed with accuracy, but is either in or adjacent to the motor center. Disease in this area does not much disturb mentality. The speech-centers, however, especially those of sensory speech representation, are almost never affected without corresponding mental changes. The prefrontal region with all of the other association areas of Flechsig are perhaps combined to form the organ of mind. Disease of any one of them may cause symptoms similar to those of prefrontal disease, as, for instance, tumor in the right temporal lobe may produce the same symptoms as tumor in the prefrontal area. The author also calls attention to the fact that when there is organic disease in insanity it is always diffuse, and apparently bears no essential relationship to the prefrontal location.

Mental Symptoms in Heart-disease.—T. D. Greenlees² has made a study of the mental symptoms and pathologic conditions in a number of cardiac lesions. He notes that in mitral disease the patients are usually excitable and impulsive; some will present religious delusions, others believe that their food is poisoned or that they are being persecuted. Actual depression is rare, but the patient tends to become suspicious. In aortic valvular disease the excitement at times amounts to violence. In cases of stenosis dementia is common, and is attributed by the author to deficient blood-supply. Periods of depression are common between the stages. Delusions of persecution with hallucinations of any or all the senses may exist. In both cardiac and valvular disease the symptoms are those of violence lapsing into dementia. Cardiac hypertrophy

¹ Phila. Med. Jour., Jan. 31, 1903.

² Caledonian Med. Jour., April, 1903.

is generally associated with delusions of physical strength shortly ending in simple, complacent, and childish dementia. In dilation of the organ the patients are noted to be emotional, suspicious, and dirty in habits. The author believes that the presence of atheroma and general paralysis shortens the course of the disease, but without definite symptoms attributable to the arterial state. Lesions of the right side of the heart give rise to restlessness and excitement, those of the left side to suspicion and depression, followed by dementia. These mental phenomena are merely exaggerations of the symptoms of sane persons suffering from heart-disease. Both seem to be due to defective blood-supply to the brain or to the accumulation of impure blood within the brain, hence the beneficial effects of digitalis as a sedative and hypnotic in asylum practice. The author maintains that insanity of heart-disease should be recognized as a definite symptom-group comparable to that of phthisis or ovarian disorders.

Menstrual Psychoses.—Krafft-Ebing¹ distinguishes several varieties of psychic disturbance attending menstruation: (1) Psychic manifestations accompanying the first appearance of menstruation. There may be from 2 to 10 or 12 attacks of the melancholic or maniacal type, and the prognosis is generally good as soon as the menses become regularly established. (2) Psychoses attending ovulation. These are noted in neurotic individuals, usually as the result of a nervous shock, and appear as severe but transient mental-confusion, which is apt to recur each month, even in cases of amenorrhea. These disturbances cease during pregnancy and after the menopause. A hereditary tendency is noted in most cases, and the attack may simulate violent mania or melancholia. They last from 5 to 14 days or more. Suicidal impulses are sometimes present. The writer recommends sedatives, hypnotics, baths, and ice-packs, while in the intervals the mental and physical habits are regulated. The prognosis is good except in cases in which mental degeneration is present. Castration may be considered as a last resort. (3) Cyclic menstrual psychoses are coincident with the menstrual wave, and appear in the form of premenstrual attacks of maniacal excitement or actual insanity, which increase in severity until the height of the wave, changing to depression and melancholia with its subsidence. This type is of considerable medicolegal importance, since the subject may entertain violent feelings against society, leading to criminal acts, such as theft, arson, or even murder. Hence Krafft-Ebing advises that in case of female criminals careful attention should be directed to the fact if the crime was committed at the time of menstruation, and if she had been habitually subject to mental disturbances at this period.

¹ Zentralbl. f. Gynäkol., 1903, No. 8.

CUTANEOUS DISEASES AND SYPHILIS.

By LOUIS A. DUHRING, M.D.,
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GENERAL SUMMARY.

To summarize the work published in the province of cutaneous diseases and syphilis during the past year, it may be stated that while the literature is as extensive as in former years, among the articles there seem to be comparatively few embodying new thoughts or important discoveries. There has, however, been much admirable work done in the field of the Röntgen ray, in a technical as well as a therapeutic direction. Thus, mention may be made of Clemensen's excellent review of the important studies of Finsen and his Scandinavian associates in numerous diseases. The difference in the properties of the *x*-rays and the ultra-violet rays has been cleverly elucidated by Piffard, as well as by others. The technic of *x*-ray work, as exploited by Schmidt, Freund, and others, may be referred to. New forms of the Finsen lamp have been introduced, that of Stopford Taylor being both small and economical.

The important observations and studies of Finsen, Svensden, Backmann, and Feilberg on the effect of red light in preventing scarring in smallpox are worthy of special mention. Up to 1899, 199 cases so treated with success were reported. Notwithstanding that some physicians have failed to obtain satisfactory results, the fault, the Scandinavians assert, is not with the method but with the technic. A few cases of that comparatively new disease designated blastomycosis have been reported, but the pathology does not seem to have been made clearer.

In the domain of syphilis one of the most interesting discussions is that of the Second International Conference for the Prevention of Syphilis and Venereal Disease, Neisser's views being an especially valuable contribution. Methods of preventing the spread of syphilis have been considered also by others, as Pokrovskaya and Griffen. The anatomo-pathologic characteristics of syphilis have received important elucidation at the hands of Renault. This pathologist states that the gumma has no anatomic characteristic, each tissue making its own gumma as it can; and he even goes so far as to say that there is no typical neoplasm of syphilis. Elaborate studies looking to the discovery of a specific bacillus of syphilis have been made by Joseph and Piorkowski. They believe that it can be demonstrated in the semen. Pagniez's review of recent research upon the blood in syphilis may be referred to, the conclusion being arrived at that syphilis is essentially polymorphic and cannot be regarded as one of the so-called anemic diseases. Parasyphilis, as

exploited in particular by E. Fournier in his book, is well reviewed by Ogilvie. The hypodermatic employment of mercury in syphilis has been discussed to a considerable extent, especially in France, where the number of advocates is growing, among whom may be mentioned Renault, Lezius, Barthélemy, Leredde, and Bing. The latter has recently published a book on intramuscular injections of mercury in this disease; among the soluble salts he regards the biniodid as preferable, calomel holding the first place in the list of the insoluble salts.

INFLAMMATIONS.

Intermittent Erythema Scarlatiniforme of Malarial Origin.—Albert Billet¹ gives an interesting case occurring in a soldier in a camp where malaria prevailed. At first the symptoms resembled closely those of scarlatina, and for this reason malaria was unsuspected, but the febrile symptoms, temperature, and sweating suggested malaria. The blood was found to be loaded with hematozoa, and there was marked leukocytosis. A hypodermatic injection of 1.5 gm. neutral quinin hydrochlorate was given and the symptoms disappeared. Recovery seemed to set in, but a week later the cutaneous and other symptoms recurred. Quinin was again employed, but failed to act so favorably as before, it being without effect on the crescentic forms of the parasite which succeed the ameboid forms. Marked improvement was subsequently observed under the use of iron cacodylate.

Observations on Erythema Nodosum.—H. W. Syers,² from his personal experience, comes to the conclusion, contrary to the accepted view, that this disease has nothing to do with rheumatism, acute or chronic. In his cases rheumatism had never preceded nor followed the cutaneous lesion, joint pains being absent throughout its course, nor were there any evidences of valvular or other heart disease. It was equally impossible to associate the disease with other morbid conditions, and the malady should therefore be regarded as one *sui generis*. He calls attention to the fact that it is closely allied to urticaria; citing a case in which the two kinds of cutaneous lesions occurred simultaneously on different regions of the general surface.

Xanthelasmaidea in an Adult.—A. Christie Read³ reports a case occurring in a nurse, aged 21, otherwise in perfect health. It began as a small blister on the dorsum of the left hand. The same evening a large yellow plaque suddenly developed on the extensor surface of forearm above the wrist, with pain, red at first, then olive-yellow. On examination the plaque was found to be the size of a silver half-dollar, on a level with the surrounding skin, with a slightly raised hyperemic areola dotted with numerous small vesicles. The same evening another wheal-like plaque higher up on the forearm developed, and she felt out of sorts and declined food. Two days later a raised plaque, with red, angular, irregular processes manifested itself on the left shoulder. Others

¹ Bull. et Mém. de la Soc. Méd. des Hôp. de Paris, April 11, 1902.

² Lancet, July 19, 1902.

³ Lancet, May 30, 1903.

soon appeared here and there. The first lesion near the wrist now became transparent and in its center a thrombosed vein was distinctly visible in the subcutaneous tissue. New yellowish, wheal-like plaques continued to appear here and there over the general surface during the following week, some of them soon subsiding, the patient being in bed. Subsequently the plaques on the arm sloughed, and a month later several scars were very noticeable. Early in the attack the coagulability of the blood was determined by capillary (vaccine) tubes. A firm coagulum was obtained in 12 minutes, the observer's own blood at the same time requiring 21 minutes. Ten-grain doses of citric acid were prescribed. Distinctly thrombosed veins were seen in two of the plaques. The coagulability of the blood was high, and if this should prove to be the case in other instances, the disease would thus be more distinctly separated from urticaria and the name urticaria pigmentosa dropped. [The disease is rare in children, and extremely so in adults.]

The Modern Conception of Eczema.—J. A. Fordyce,¹ in an address before the section of Cutaneous Medicine and Surgery of the American Medical Association, goes into the subject of the general and local pathology of the disease, directing attention first to two discordant views in the profession as to what should be designated eczema. The microbic or infectious nature of the disease is also dwelt upon at length. The views of the author may be briefly summarized in effect that he desires to combat the views which generally prevail among physicians that eczema is necessarily due to constitutional causes. He does not desire to minimize the importance of such general conditions as favor the development of eczema, but wishes to direct attention to the importance of local causes that excite the reaction in the epidermis and papillary layer of morbid conditions that are generally recognized as eczema. He thinks it is rational to suppose that such inflammatory changes are due to a local irritant of a microbic or chemical nature, which through its chemotactic power excites an outpouring of leukocytes and serum. He further states that there is almost as good reason for supposing that eczema is caused by a local agent as that acne has had such a cause, for in both the best results in treatment are obtained by the judicious use of local remedies. [The author, it will be observed, thus arrays himself on this vexed question—that has been discussed pro and con for the last fifty or more years—on the side of the local origin and nature of the disease, but there are many observers who favor the internal origin, and there is surely a great deal to be said favoring this view.]

Naftalan in the Treatment of Eczema.—A. Charkow² used this drug in 180 cases of different varieties of eczema and artificial inflammations of the skin. The best results were obtained in the moist forms of acute or chronic eczema, and in such cases it is well tolerated by the skin. Where there is much thickening of the skin, however, tar is to be preferred. In the dry, scaly varieties it cannot be recommended. The drug acts as a soothing remedy to the irritated skin, dries up discharges, and allays

¹ Jour. Am. Med. Assoc., June 13, 1903.

² Monats. f. prakt. Derm., Bd. xxxv, No. 8.

itching and pain. It may be used as a powder, with equal parts of zinc or starch. It is a cleanly and acceptable remedy.

Further Observations Regarding the Malarial Origin of Zoster.—James McFarlane Winfield¹ (Brooklyn) goes into the subject of the various theories and the etiology of the disease, and concludes by stating that there is great uncertainty regarding the cause of the disease. We know that a zoster-like eruption often accompanies lesions of the nerves or of the root-ganglions; that poisoning from coal-gas, arsenic, and the like may be followed by a zosteroid eruption; and, further, that there is an infectious disease that always manifests itself upon the skin in a characteristic manner. The author states that while the number of cases reported is not sufficient to establish the etiology for a large class, still nearly 40 % of all cases of zoster observed by him in practice during the last 9 years were undoubtedly in some way influenced by malarial toxemia. It would seem possible that malaria could be found to be an etiologic factor in many of the so-called epidemics of zoster.

Martin F. Engman² (St. Louis) reports 18 cases of various eruptions associated with malarial infection. Six of the cases were urticaria, and 5 zoster. The presence of the plasmodium *malariae* was demonstrated in the blood in all of the 18 cases.

Concerning some Vaccinal Eruptions.—H. W. Stelwagon³ reviews this subject at length, referring to many of the innumerable cases reported, and expresses his own views in effect that all eruptions occurring after vaccination are not necessarily vaccinal, "although it is true that many of them are." In those eruptions commonly observed—urticaria and the various types of erythema multiforme—the author believes that the causative factors lie with the virus itself, either to its preparation or preservation, and possibly to some admixture or changes in the lymph constituents, and not necessarily of extraneous origin, this view seeming to be borne out by the fact that the serums used in the treatment of certain maladies will likewise often produce similar eruptions.

Vulvar Eruption Occurring after Vaccination.—A. Bankier Sloan⁴ reports an unusual case of a young woman who was vaccinated by him on the arm. From the time the virus began to take, she felt ill, and on the sixth day the vulva became greatly swollen, edematous, and tender, and the mucous membrane of the labias was dotted with small pustules, the eruption looking like localized variola in the pustular stage, except that the pustules were smaller. There was little or no induration of the vulva. The pulse was 110 and the temperature 100°. The following day the mucous membrane was discharging profusely and some of the pustules had burst, the swelling and discharge continuing for some days. The vulvar disease in the beginning came suddenly. The vesicles on the arm were at their height when the vulvar eruption appeared; they were well-developed, of good size, and were causing considerable local reaction. The author regards the case as probably one of accidental

¹ N. Y. Med. Jour., Aug. 2, 1902.

² Med. Bull. of the Washington Univ., Jan., 1902.

³ Jour. Am. Med. Assoc., Nov. 22, 1902.

⁴ Brit. Med. Jour., Feb. 21, 1903.

autoinoculation, but this was not shown, and even if this were proved, the case was extraordinary. [It does not seem at all probable that this was an instance of autoinoculation, but that it was a rare vaccinal eruption.]

Psoriasis following Vaccination.—Dore¹ records 3 patients in whom a more or less extensive psoriasis appeared after vaccination. The first patient was a young man, aged 20, without history of a previous skin affection. On the eighth day after a revaccination a red, scaly eruption appeared upon the legs, which soon extended to the arms and trunk. Upon appearing at the hospital he presented an extensive psoriasis, which differed from an ordinary attack only in the fact that the site of the vaccination was marked by circular, red, scaly patches. The second case occurred in a woman, aged 30. The vaccination did not heal for 2 months, and eventually became covered with red, scaly patches, which were followed by others on various parts of the body. When seen she had typical psoriasis. The patient was otherwise healthy, and had not had any skin affection previously. The third case was a young woman, aged 18, in whom, after vaccination, a "red, patchy rash" appeared which, disappearing in 3 days, was followed by psoriasis presenting the usual features. In this case there was a history of an eruption at 11 years of age resembling the present one.

Psoriasis following Nervous Shock.—Balzer and Faure-Beaulieu² report the case of a man, aged 54, who, after seeing one of his children narrowly escape being run over by a tram-car, was seized with nervous trembling, chills, and fever so severe as to confine him to bed. The next day red spots were noticed upon the left forearm which were followed in a day or two by others upon the chest and legs. Upon his admission to the hospital 15 days later, he presented a typical guttate psoriasis. The patient had never had any cutaneous affection previous to this attack of psoriasis, nor was psoriasis present in any member of his family.

Thyroid Extract in Psoriasis.—English³ reports a case of intractable psoriasis in which all of the usual remedies had been employed over a period of 4 years. A family history of myxedema was discovered in the patient's mother, which led the writer to prescribe thyroid extract. Recovery from this date was rapid, and in less than a fortnight the cutaneous disease had disappeared.

Treatment of Psoriasis.—George H. Fox⁴ recommends: R. Chrysarobin, 10 parts; salicylic acid, 10 parts; ether, 15 parts; collodion, q. s. ad 100 parts. This is to be painted on the patches until the scaling has disappeared and smooth whitish spots remain. According to the author, the advantage of the preparation is that "all staining of the chrysarobin is obviated."

A. Bayet⁵ thinks that chrysophanic acid is the best remedy in the treatment of this disease, and advises its use in suspension in chloroform or in an ointment. The formulas given are: R. Chrysophanic acid,

¹ Brit. Jour. of Derm., Sept., 1902. ² Ann. de Derm. et de Syph., 1902, No. 6.

³ Brit. Med. Jour., Nov. 22, 1902. ⁴ Phila. Med. Jour., Jan. 10, 1903.

⁵ Jour. Méd. de Bruxelles, April 10, 1902.

75 grains; chloroform, 750 grains. This is applied by means of a brush, and after the chloroform has evaporated the yellow deposit of the active drug is fixed on the surface of the skin by painting with a gutta-percha solution in chloroform, 75 grains in 750 grains. At the end of 4 or 5 days the pellicle formed comes off in the bath and a fresh application is made. It must be remembered that the peculiar inflammation due to this drug is liable to occur; that it is conspicuous; stains the skin as well as the linen, and is liable to irritate the mucous membranes. During treatment the urine should be observed.

Psoriasis Treated with Myelocene.—D. C. Watson and J. A. D. Thompson¹ give the notes of 5 cases, with photographs, in which this preparation of bone-marrow was used as an application with good results. Facts are brought forward which seem to justify the opinion that myelocene contains a substance of distinct therapeutic value in this disease. One of the authors had previously recorded favorable results from the application of the preparation in a series of cases of chronic ear disease. The preparation was usually applied weakened with 50 % almond oil. "Toxic effects will undoubtedly follow the unskilled use of myelocene." [The preparation was made for the authors by Macfarlane & Co., Abbeyhill, Edinburgh.]

Treatment of Iodoform Dermatitis.—W. A. Bryan² (Nashville), after describing a severe case of poisoning of the skin from this drug, the inflammation being erythematous, edematous, and vesicular, speaks of the treatment, stating that after every particle of the drug on the skin has been removed by cleansing and the use of hydrogen dioxid, 5 % carbolized vaselin or an aqueous solution of carbolic acid give better results than any other remedy. It is well at each dressing to immerse the affected skin in hot water for 10 to 30 minutes.

Local Treatment of Impetigo Contagiosa.—M. F. Engman³ recommends the following prescription, much used in Hardaway's hospital service, and which "when properly used is almost a specific": Rx. Precipitated sulfur, zinc oxid, and potassium sulfid, of each 1 dram; rose-water, 3 ounces. This is applied after softening and removal of the crusts by boric acid ointment. The skin is then washed and dried, and the lotion with the sediment applied several times daily. In some cases where the skin is delicate the lotion may be diluted with one part of water.

Heat for the Relief of Itching in Ivy-poisoning.—Chas. F. Norton,⁴ writing from Key West, states that since his attention was called to the value of this remedy by W. H. Forbes, of Milton, Mass., in his own case, he has found that it gives more relief to the intense itching which accompanies this disease than any other remedy he has tried. The affected part may be plunged into hot water or bathed with a sponge.

Treatment of Prurigo of Hebra.—M. de Beurmann⁵ has used with success the following on a patient who had suffered for 7 years with this

¹ Lancet, Oct. 13, 1902.

² Jour. Am. Med. Assoc., April 11, 1903.

³ N. Y. Med. Jour., July 19, 1902.

⁴ Jour. Am. Med. Assoc., Aug. 23, 1902.

⁵ Ann. de Derm. et de Syph., July, 1902, p. 746.

chronic disease: Camphor, 12 parts; tar, 15 parts; sulfur, 8 parts; chaulmoogra oil, 3 parts; vaselin, 62 parts. The itching was relieved and the thickening of the skin subsided. Numerous other remedies had been previously used without much success. [Prurigo as defined by Hebra is so rare as to be an almost unknown disease in this country.]

Treatment of Lichen Planus.—Joseph Zeissler¹ prefers in generalized eruptions of this disease arsenic, beginning with 2-drop doses of Fowler's solution thrice daily, and increasing daily by one-fourth of a drop until the point of tolerance is established; then reducing the dosage by the same method. Following the recommendations of Brocq and Jacquet, the author has in the past 8 years used hydrotherapy with excellent results. A tepid bath of 10 to 15 minutes' duration is given daily, after which by means of a hose attached to the hot and cold water spigots the water is applied to the region of the spinal column, at first lukewarm, then gradually cold, followed by a half-hour's rest in a bathrobe. This treatment finds favor with patients.

Prevalence of Herpes Zoster.—Max Joseph² (Berlin) from his investigations draws the following conclusions: (1) In frequency, herpes zoster causes 1 % of all skin diseases. (2) There appears to be no difference in the occurrence of herpes zoster in men and women. (3) Herpes zoster is a disease of youth (15 to 30 years), noted, according to my statistics, in two-thirds of the cases. Before school age the disease is very rare; during school it becomes more frequent; after 30 years its frequency diminishes, and in old age it is rare. (4) So far as regards the region of the body affected, herpes zoster is, in general, more frequent, the more nerves supply the region. There is one exception to this rule, both from my observations and those of Greenough, namely, an exceptionally large number of cases in the trigeminal region. This may, perhaps, be due to the fact that the region supplied by the trigeminus is more open to injury and disease than any other region. (5) Both sides of the body are apparently affected with equal frequency, bilateral herpes zoster being rare. (6) Zimmerleni says that herpes zoster occurs among physicians and nurses in epidemic form; no other occupation seems to predispose to the condition. The final settlement of this point can only be made by consulting industrial and hygienic statistics. (7) Epidemics of herpes zoster occur in the spring and fall. Sporadic cases occur with almost equal regularity throughout the entire year, though some increase is noted in the spring and autumn months.

Recurrences of Herpes Zoster.—Paul Fabre,³ of Commentry, concludes his communication by stating that while recurrences are exceptional, he has nevertheless recorded 4 instances out of 207 recorded cases of the disease that he has observed in 37 years. These cases were all clearly defined. He has, besides, encountered some other cases for which he would propose the name of "repeating herpes zoster" ("zona à répétition"), in which the disease, having been entirely cured and disappeared, reproduces itself in the same place and at intervals more or less regular,

¹ Jour. Am. Med. Assoc., June 13, 1903.

² Phila. Med. Jour., Oct. 25, 1902.

³ Bull. de l'Acad. de Med., April 21, 1903.

but not exceeding 12 or 15 months. Finally attention is directed to those herpetic localized eruptions—labial, nasal, genital, vulvar—which it would be premature to separate from the genus herpes to attach to herpes zoster, but which might be grouped under the title of "periodic herpes zoster."

Fatal Case of Acute Malignant Pemphigus.—W. J. Caie¹ reports a case, occurring in a farm laborer, which in about a week from the beginning terminated fatally. The temperature in a few days from the beginning ascended rapidly to 103.4°, then in 4 days descended rapidly to 96.2°, when death occurred. There was no albuminuria and the kidney function was normal. There was marked constipation throughout the illness. In the first two days of the attack the pulse and temperature were normal and the man felt well. Arsenic was used.

Etiology of Acne Vulgaris.—T. C. Gilchrist,² after alluding to the work done in this direction by Unna in 1893, Hodara in 1894, Lomry in 1896, and Sabouraud in 1894, makes the statement that "up to 1899 no observer had succeeded in obtaining the acne bacilli pure from lesions of acne vulgaris or comedo, and there was practically no proof that these bacilli were the cause of acne vulgaris." The author then directs attention to his own published work on this subject in 1899, and concludes from more recent investigations that definite bacilli (*Bacillus acnes*) were present in all smears taken from 240 typical acne lesions from 86 patients. Pure cultures were obtained from 62 lesions (chiefly acne nodules) from 29 patients. It is present as a short thick bacillus in smears, but in culture often becomes much longer and thicker, and in old cultures assumes distinct branching forms. He considers it definitely proved that this microorganism is the primary cause of acne vulgaris.

Results Obtained in the Treatment of Acne by Exposure to the X-rays.—R. R. Campbell³ (Chicago) has obtained results sufficiently gratifying to justify the report of 15 cases, which were not selected, none being subjected to either external or internal treatment while under exposure to *x*-rays. The uniformity of the results was striking. In all of the cases a medium soft tube with weak light was employed, with slight variance in the time of exposures and the distance of the tube from the skin.

Treatment of Ringworm.—G. T. Jackson⁴ (New York) directs attention to the value of pure goosegrease as an excipient for the employment of parasiticides in the treatment of this disease. A dram or more of the crystals of iodin to the ounce of goosegrease makes a useful remedy. The finest goosegrease, being made from the fat of uncooked goose, is expensive. In obstinate cases a half a dram to a dram of croton oil to the ounce of sulfur ointment sometimes proves useful. In a few days it will set up considerable inflammation and causes the patch to become bald, but eventually the hair grows in again and the disease is cured.

Epicarin in Tinea Tonsurans and Tinea Circinata.—A. Van Har-

¹ Brit. Med. Jour., Feb. 5, 1903.

³ Jour. Am. Med. Assoc., Aug. 9, 1902.

² Jour. Cutan. Med., March, 1903.

⁴ Med. Rec., April 11, 1903.

lingen and H. K. Dillard, Jr.,¹ give their experience with this drug in these diseases. Epicarin is a condensation product of creotinic or creosotinic acid and β -naphthol, and is a reddish, amorphous powder with a slight odor resembling acetic acid. It is soluble in alcohol, ether, and liquid vaselin, and may be employed in the form of a 10 % or 20 % alcoholic solution or as an ointment. The drug was first employed by Kaposi, and in scabies. The authors conclude from their experience that the drug is useful in ringworm of the scalp, employed preferably in the form of a tincture, 10 % to 20 % strength, and after epilation it appeared to act more rapidly and favorably than any of the other remedies in common use. In ringworm of the body the tincture seemed irritating and to be slow in action, while in an ointment form it was not equal to ammoniated mercury ointment nor to most of the other remedies ordinarily used. In one case of tinea favosa the result was such as to encourage further trial. In scabies it proved irritating, and was by no means equal to sulfur and naphthol ointment.

Dhobie Itch.—Chas. F. Mason² states that dhobie (laundryman's) itch—so called from the idea that it was spread through the uncleanly habits of the "dhobie," or washerman—is an epiphytic disease, and is usually caused by one of the trichophyton fungi or the germ of pemphigus contagiosus. In the Philippines last year it was prevalent, and it has been brought to this country by returning soldiers, being lately very common at Fort Sam Houston, Texas.

Favus of Scrotum Coexisting with Ringworm of Thigh; Identical Trichophyton-like Cultures.—A. D. Newborn³ discusses the subject of the cultures of the achorion Schoenleinii and the trichophyton fungus, and concludes that this case may be regarded as one in which the same trichophyton (a Megalasporon ectothrix of probable animal origin) on the same patient, but in different parts of the body, where the conditions of soil were different, produced two clinically distinct diseases: viz., favus and ringworm.

Primary Actinomycosis of the Occiput.—Bohm⁴ reports a case of primary actinomycosis occurring in the occipital region. The patient, a butcher, aged 26, had an acute inflammatory swelling, accompanied by fever and pain. Under treatment with ice-bags and solution of lead acetate the inflammatory symptoms subsided, but the swelling remained. After a time scattered, firm nodules appeared in the swollen parts, which slowly underwent softening, forming abscesses which opened spontaneously. In the fluid evacuated from these abscesses were yellowish-gray granules, which were found by microscopic examination to contain the actinomyces fungus. After dividing the fistulas, pure tincture of iodin was injected, which produced marked improvement, so that after 2 months' treatment, during which about 25 injections were made, the disease was cured. No recurrences have taken place in 3 years. The author thinks infection occurred through scratching the scalp with the fingers, which had been soiled by handling the flesh of an actinomycotic bullock or hog.

¹ Am. Jour. Med. Sci., June, 1903.
³ Jour. Cutan. Dis., Jan., 1903.

² Med. Rec., Oct. 25, 1902.
⁴ Arch. f. Derm. u. Syph., Bd. lix, Heft 3.

Tinea Favosa Capitis Successfully Treated with Izal.—D. Duckworth¹ considers, from the treatment of 2 marked chronic rebellious cases with this drug, that it possesses distinct advantages over most other parasiticides. Though a stimulant, and possibly an irritant, it is nontoxic. It was employed as a 50 % ointment with lanolin in one case, and with glycerin and water in the other case. Improvement began in a few weeks, and the cures seemed to have been permanent in both instances. The hair grew in again except in the originally bald areas.

Tinea of the Nails in Iceland.—Pernet² demonstrated the parasite in finger-nail scrapings, the disease being common in Iceland, where it is contracted from sheep, 1 or 2 out of every 10 peasants suffering from it. Ehlers, of Copenhagen, pointed out the parasitic nature of this disease, called in Iceland "kartnegluer" (from *kart*=card, for combing out wool; and *negluer* = nails). The specimen showed the mycelium, which in some preparations was very profuse, especially in scrapings from the under surface of the nails.

Framboesia Tropica and Tinea Imbricata.—Koch,³ during a journey in the tropics, noted the great number of diseases of the skin prevalent in New Guinea and the neighboring island groups, and gives a brief account of the two most commonly met with: viz., framboesia and tinea imbricata. He thinks it probable that the disease known in various parts of Africa as framboesia is not the same affection which is thus named in the South Sea. The South Sea framboesia is a contagious disease, and can be inoculated from one person to another, and one attack confers immunity, and in the regions where the malady is indigenous it is almost exclusively an affection of childhood. The cases which Koch saw occurred in children from 1 to 12 years old. The legs, arms, the lower portion of the back, the buttocks, and in isolated cases the face and nape of the neck were covered with ulcerations, circular in shape, arranged in groups, and occasionally confluent. They varied in size from a hemp-seed to a five-mark piece, projected above the level of the surrounding skin, and appeared like swollen granulations. The newest lesions resembled the pustules of variola, forming elevated nodules covered with epidermis, and showing decided umbilication. The larger nodules had always lost the epidermis, secreted a seropurulent fluid, and were covered with moist crusts, beneath which there was a cushion-like, granulating mass. Some of the largest resembled flat condylomas, especially when they were situated in the region of the anus or genitalia. Various stages of the lesions were present in one and the same child, the nodules not appearing simultaneously, but new ones arising from time to time until the patient's susceptibility is exhausted. The duration of the disease is from some months to a year or more. When small children are severely attacked, it may prove fatal. When it is introduced into an island where it has hitherto not occurred, adults as well as children are affected;

¹ St. Barth. Hosp. Rep., vol. xxxviii, p. 155, 1902.

² Brit. Jour. of Derm., March, 1900, p. 106.

³ Arch. f. Derm. u. Syph., Bd. lix, Heft 1.

but Koch never heard that Europeans were attacked by it. Concerning the cause of frambesia, nothing reliable is known. Tinea imbricata occurs chiefly in the South Sea Islands, and is due to a fungus akin to the trichophyton. Like ordinary ringworm, it occurs in circular patches, but, unlike the latter affection, it does not produce rings through healing of the center of the patches. The diseased epidermis consists of thin lamellas arranged like the tiling of a roof, a feature which gives the affection its name. It is extraordinarily frequent in adults, almost every inhabitant of some of the villages being affected. The general health is not affected; but chronic swelling of the lymph-glands, especially the inguinal and femoral glands, is very frequent.

Botryomycosis in Man.—Bodin¹ has studied histologically and bacteriologically 2 cases of this affection. The first was observed in a woman, 27 years old. The disease began as a small nodule upon the posterior surface of the right thumb at its base. For a month the little tumor remained stationary, then it began to grow rapidly and ulcerate. It was the size of a hazelnut, rounded and covered with small fissures. At its base there was a deep circular furrow, at the bottom of which was a smooth, short, rounded pedicle by which the tumor was attached to the skin. It was excised with the scissors and a complete cure followed in a few days. The second also occurred in a woman, and was precisely like the first, except that the tumor was situated upon the palmar surface of the first phalanx of the middle finger of the right hand. Examination of the tumors showed that they were composed of young connective tissue rich in vessels running in all directions, having very slender walls, often consisting only of the endothelial layer. In the outer parts of the growth there were evidences of inflammation. Search for the mulberry-like masses supposed to be due to the parasite named botryomyces—the so-called castration fungus of the horse—was negative, nothing but an ordinary coccus taking the Gram stain being found. The author concludes that the microorganism described under the name botryococcus, claimed by Poncet, Dor, and Spick to be the cause of a peculiar neoplasm in man, is not a specific organism, but is identical with the yellow staphylococcus. The botryomycocitic neoplasms, it would seem, are therefore only fleshy granulation-tissue produced under the influence of Staphylococcus aureus.

Abortive Treatment of Furuncles with Concentrated Solution of Iodin in Acetone.—Gallois and Courcaux² recommend the above, acetone dissolving about 4 times as much iodin as alcohol. It was tested upon typhoid fever cases. A fresh solution is more irritant than an old one, while the ordinary tincture becomes more caustic with age. If the skin is intact, hardly any sensation is felt from the application. In 24 hours all signs of inflammation usually disappear after a single application, provided no suppuration exists. It requires caution in handling, on account of its causticity.

Röntgen Dermatitis.—D. Wiesner³ concludes that the true Röntgen

¹ Ann. de Derm. et de Syph., 1902, No. 4.

² Gaz. des Hôp., Jan. 20, 1903

³ Münch. med. Woch., June 24, 1902.

rays and not the electric or chemical ones which also emanate from the tubes are responsible for the dermatitis so often seen, which may be acute or chronic. In a patient observed by the author there was an eruption on the hands and arms, similar to chronic dermatitis, which spread to the face and trunk with suppuration in many localities. The process is explained on the hypothesis of a trophoneurosis; the negative ions issuing from the tube penetrate the skin and create a chemical change in the molecule in or about the nerve-endings, which by way of reflex is followed by trophic disturbances in the skin, and this accounts for the concomitant falling out of the hair, the long period of incubation, and the slight benefit from therapeutic procedures.

X-ray Dermatitis.—Wiesner¹ reports the case of a healthy young man of blond complexion, who was much occupied in a laboratory testing x-ray apparatus. The disease affected the face and the chest, consisting of swelling and vesiculation, together with some pain, and irritation of the conjunctiva with flow of tears. The hair in the affected region fell out, but later returned, except on the lip and chin. The disease due to the x-ray is regarded as a trophoneurosis.

A Case of X-ray Dermatitis.—L. A. Prince² records a case occurring in his own person, 3 distinct attacks at several months' interval manifesting themselves, all much alike, but progressively severe, characterized by diffuse redness, with mottling, swelling of a rather firm character, without pain, thickening of the nail-folds, and brittleness of the nails, so much so that the slightest blow would knock off a piece of the nail. There were also longitudinal ridges near the nail-fold with splitting at the terminal borders. Any laceration of the skin was followed by free hemorrhage, but all injuries healed promptly. The condition became chronic. Varied local treatment seemed valueless.

Dermatitis Coccidioides.—Montgomery, Ryfkogel, and Morrow³ add a new case of this rare and extremely interesting affection to the small number previously reported. The patient was a man, aged 54, a native of Switzerland, neither tuberculous nor syphilitic. The disease had begun 7 years before as enlargements of the left hand and forearm. Four years later an eruption appeared upon the chest, remains of which were still present, and later an eruption appeared upon the left forearm and hand. There was hypertrophy of the skin and subcutaneous tissue of the left forearm, hand, both legs, and left foot, but no enlargement of the bones. Over the chest and abdomen there was pigmentation, occurring as brown, pea-sized spots, the remains of a previous papular eruption. On the left forearm and back of the left hand there was an eruption of discrete papules, pustules, and nodules, many of the pustules being covered with crusts. Upon the neck there was a pustular folliculitis forming a boggy mass, and the right ear presented a condition resembling an acute eczema. Upon the left leg there was a superficial elephantiasis with papillary overgrowth. The patient had been treated for syphilis at various times without benefit, and had taken potassium

¹ Munch. med. Woch., June 24, 1902.

² Phila. Med. Jour., Aug. 9, 1902.

³ Jour. of Cutan. Dis., Jan., 1903.

iodid in increasing doses without producing any change in the disease. For two months he was treated with the Röntgen rays with decided benefit, the pustules drying up and the nodules becoming flatter; but this treatment had to be interrupted because of the progress of the internal infection. Death occurred one year after the correct diagnosis had been made. At the autopsy the suprarenal capsules were found to be much enlarged, the normal tissue being replaced by a friable, fairly dense, yellowish-white tissue. The left lung throughout its entire extent and the upper lobe of the right lung contained numerous bodies resembling miliary tubercles. Microscopically the tubercle-like bodies and the suprarenal capsules were found to consist of granulomatous tissue containing numerous giant-cells and capsulated bodies, many of the latter being included in the giant-cells. The organism found in the disease presented a double cycle of growth, one in the tissues, the other on culture-mediums, the two cycles having no features in common. In the tissues it occurred as a sphere 3.5 to 5 microns in diameter, surrounded by a clear capsule, the outer wall covered with spines which could only be seen in the fresh specimen. The smaller capsules had clear or granular contents, the larger ones were filled with endogenous spores. Outside of the body the growth was that of a mould fungus. When a sufficient quantity of the culture was employed, intraperitoneal inoculations in the guineapig were invariably fatal.

A Case of Blastomycosis.—J. H. Sequeira¹ describes a case (with illustration) of this rare and new disease affecting chiefly the region of the lower eyelids, occurring in a strong, healthy man, aged 37. The clinical appearances and the results of pathologic examination exclude rodent ulcer, epithelioma, and other neoplasms of the skin, and also lupus and other granulomas. The diagnosis was based on the following points: (1) The face and scalp alone were affected. (2) The lesions were multiple. (3) These spread and fresh lesions appeared apparently by inoculation. (4) The edges of the tumors were well defined and there was but little infiltration. (5) This soon became pustular, and thin whitish pus could be squeezed from the lesions. (6) Microscopically there were numerous minute epidermal abscesses. (7) In these abscesses and in the pus squeezed from them budding yeast-like organisms were found. (8) From the deeper layer of the epidermis branching downgrowths of prickle-cells were found extending into the corium. The growths were markedly influenced, but were not entirely dispersed by potassium iodid in large doses.

The Red-light Treatment of Smallpox.—Nils R. Finsen² asks, Is the treatment of smallpox patients in broad daylight warrantable? Ten years ago he advocated the use of red light in the treatment of this disease, since which time it has been employed by many physicians in many places, meeting everywhere with unquestionable success; but the method, to be successful, must be properly conducted. It may be considered an irrefutable fact that daylight and especially the chemical rays have a most injurious effect on the course of smallpox, as the suppuration of the

¹ Brit. Jour. of Derm., April, 1903.

² Brit. Med. Jour., June 6, 1903.

vesicles is due to the effect of light. On the other hand, light seems to have no action on the smallpox infection itself, and death caused by the latter cannot be prevented by excluding the chemical rays. But the avoidance of suppuration is in itself of the greatest importance; for it is a well-known fact that the suppurative stage is the most dangerous of the several stages of smallpox; moreover, the greatest number of deaths are due to suppuration, which, other things being equal, would be prevented if no suppuration were present. The action of light on the course of smallpox is astonishing, and the effect of the red-light treatment is one of the most striking results known in medicine; but if suppuration has begun or is on the point of beginning, the red-light treatment will not stop it. Unless an epidemic of smallpox is of an exceptionally fatal character, the death-list may be reduced 50 % by the employment of this treatment over the treatment in broad daylight. [The method referred to has been exploited in detail by Finsen in numerous publications, especially in his work on "Phototherapy," published in English; London, 1901. The author asks that a Commission be appointed in Great Britain to investigate the correctness of his statements on the value of this treatment.]

An Examination into the Claims of the Red-light Treatment of Smallpox.—Jay F. Schamberg¹ first refers to Finsen's red-light experience in the treatment of this disease as described by him, who sums up the work done by himself and others (chiefly in Denmark, Sweden, and Norway) by saying that out of a total of 140 to 150 cases of smallpox, in one case only (that of Benckert) was the method inefficacious. During the winter of 1902 W. M. Welch and the author fitted up a room for the red-light treatment of smallpox. Two cases were so treated, the results being such as to destroy any confidence they may have had before in this mode of treatment. The results in these two cases were discouraging, one patient, a young man dying, while in the other the scars were most disfiguring. Schamberg expresses the view that the virulence or grade of the disease has much to do with the scarring, and that the photographs of Finsen's cases, as published in his book, treated with red light, who recovered with no scarring or only insignificant scars, are such as would be regarded in this country as mild and favorable cases, the eruption being on the skin rather than in it.

The Contents of the Vesicles and Pustules of Smallpox.—Jay F. Schamberg² from his investigations concludes that the pustulation in smallpox is not due to secondary infection with any of the ordinary pyogenic germs, but is the result, in all probability, of the action of the microorganisms which produce the disease. Streptococci and other adventitious bacteria may be present in the late pustules, but occur only exceptionally in the early lesions. It is probable that the streptococcus plays an important part in the development of impetigo, boils, abscesses, erysipelas, and gangrene which so frequently complicate smallpox.

¹ Jour. Am. Med. Assoc., May 2, 1903.

² Jour. Am. Med. Assoc., Feb. 14, 1903.

HYPERTROPHIES AND ATROPHIES.

Cutaneous Pigmentation of Genital Origin in Women.—Paul Dalché and Ch. Fouquet¹ present a case and cite various other illustrative cases. The patient, aged 57, was afflicted with black pigmentation. Until the age of 53, she had always enjoyed good health. But at that time she began to grow thin, losing her appetite and becoming weak and languid. There was no organic disease discoverable. There were two striking phenomena in her illness. One was the frequent outbreak of pustules which, without cessation, developed on the fingers and sometimes on the body; the other was a general discoloration on the hands, fingers, and thighs. Although careful with her personal hygiene, the linen became quickly soiled. The hands, principally at the finger-tips, were visibly black, not uniformly, but in places. She washed them frequently, but the pigment reappeared. Menstruation had ceased one or two years before.

Tattoo Marks.—Ohmann-Dumesnil² states that these marks may be removed by electrolysis, irritation in the skin being excited by a needle attached to the negative pole being driven into the skin beneath the tattooing, about 10 milliamperes being employed. The inflammation set up throws the pigment to the surface.

Albinism Among the Melanesians and Polynesians.—C. G. Seligmann³ (London) had the opportunity of studying a number of albinotic subjects while in Torres Straits and New Guinea, who uniformly differed in certain characteristics from European albinos, so much so as to suggest that the type alluded to is as much a racial characteristic as height, skin color, or cephalic index. The choroid is never pink and the hair is more or less tow-colored, the skin varying from a pink-white color to that of coffee and milk, while the eye is generally greenish, hazel, or brown. The hair is no finer or silkier than in the normal Papuan. An exceedingly definite type of leukoderma is very common in British New Guinea.

The Cause and Pathology of Baldness.—F. Tremolieres⁴ considers mainly the dental theory of Jacquet. Out of 200 cases Jacquet was able to present 27 in which this relation was clearly established. Baldness is not a specific ailment but a symptom, sometimes of importance, in other cases of insignificance. Neuralgia or other forms of nerve disturbance are apt to precede these alopecias. [The author thus leans to the nerve as against the parasitic theory, which latter of late has had so many upholders in France.]

X-ray and Trikresol in Alopecia Areata.—Heidingsfeld⁵ experimented with both of these remedies, the results being in favor of trikresol. In one case the previous employment of the *x*-rays seemed to retard the return growth of hair. The favorable results in the case of trikresol were observed in from 2 to 6 months after beginning the applica-

¹ *La Gynécologie*, Feb., 1903.

² *Pacific Med. Jour.*, July, 1902.

³ *Lancet*, Sept. 20, 1902.

⁴ *La Presse Méd.*, No. 48, June 14, 1902.

⁵ *Cincinnati Lancet-Clinic*, Sept. 20, 1902.

cation. The author thinks so well of this drug that he now employs it to the exclusion of other remedies.

Treatment of Corns.—E. Harding Freeland¹ (London) has given this matter attention from the standpoint of the surgeon, and points out that the methods of treatment in ordinary use are, at the best, palliative, the essential part of the corn being left behind; hence recurrence. Treatment to be curative must secure the removal of the entire corn, together with the underlying bursa, if existent; and to this end he advocates the free and complete excision of the growth. While this operation is simple, it belongs to the surgeon, and should not be entrusted to the chiropodist.

H. A. Reeves² confirms E. H. Freeland's observations as to treatment, and further remarks that corn-cutting, either by the sufferers or chiropodists, is productive of harm. Excision of the painful or inflamed corn, and underlying and often inflamed bursa, is the only correct method if a radical cure be reached, and such has been his practice at the Royal Orthopædic Hospital for many years.

Ritter³ advises for hard corns **prolonged immersion in a warm solution of washing soda** and subsequent scraping, and the tender surface covered with a salicylic acid plaster or the following: Rx. Salicylic acid, 30 gr., ext. cannabis indica, 5 gr.; glacial acetic acid, 5 gr.; oil of turpentine, 15 m; cocaine, 5 gr.; collodion, q. s. ad 3 iv.

Remarks on Sclerema Neonatorum.—E. R. Stillman⁴ (Troy, N. Y.) gives the notes of a case under his observation. At birth the infant was cyanosed, which condition disappeared after 48 hours. On the eighth day the baby refused to nurse and seemed generally tender to the touch. Induration of the skin beginning in the genital region spread up over the trunk and down the thighs and legs. The least touch of the skin caused the baby pain. The next day the skin everywhere was hard, and could not be pinched up into folds. The fourth day of the illness death occurred. The autopsy was remarkable in that it showed but little that was abnormal.

NEOPLASMS.

The Relation of Lupus Erythematosus to Tuberculosis.—Henry G. Anthony⁵ gives an interesting paper on this much-discussed topic, arriving at the conclusions: (1) That discoid lupus erythematosus is a granuloma, which has no relation whatever to tuberculosis, but which may be accompanied by a general eruption; (2) that tuberculosis may produce symptomatic lupus erythematosus, usually with disseminate, atypic plaques; (3) that what may be shown by statistics regarding the relation of lupus erythematosus to tuberculosis depends on what is understood as evidence of tuberculosis and also on what is included in lupus erythematosus.

¹ Brit. Med. Jour., Jan. 24, 1903.

² Ibid., March 21, 1903.

³ Phila. Med. Jour., Feb. 10, 1903.

⁴ Jour. Am. Med. Assoc., April 25, 1903

⁵ Jour. Am. Med. Assoc., Jan. 10, 1903.

Lupus Erythematosus of the Face and Tuberculous Angiodermatitis of the Hands.—Leredde and Pautrier¹ (Paris) bring forward facts and arguments in favor of the tuberculous theory of lupus erythematosus, and which they support with observations. Thus, patients attacked with lupus erythematosus are as often affected with tuberculous manifestations (ganglionic, osseous, articular) as those suffering with lupus vulgaris. They die of pulmonary tuberculosis oftener even than those with lupus vulgaris, according to Besnier. There exists a clinical type known as acute lupus erythematosus in which death from tuberculosis is the rule. There exists a form of lupus, known as "lupus erythematoïdes," in which are found simultaneously lesions very well differentiated from those of lupus erythematosus and those of lupus vulgaris. In those cases of lupus erythematosus of the common type that Audry examined carefully in making from 50 to 100 microscopic sections giant-cells were discovered three times. In lupus erythematosus of the face we find adenopathies corresponding to the territory invaded containing tubercle bacilli (Hallopeau and Jeanselme, Leredde). If lupus erythematosus does not react regularly to tuberculin, the reaction is observed in some cases. The question of lupus erythematosus cannot be isolated from that of tuberculous angiodermatitis in general. For some cases the tuberculous nature of lupus erythematosus must be considered as now being well established.

Lupus Erythematosus.—J. H. Sequeira and H. Bateau,² from a study of 71 cases, conclude that it is due to a circulating poison or toxin; in its acute disseminated form it is associated with tuberculosis in the majority of cases, but in the discoid form this association is much less apparent; the occurrence of albuminuria is part of the toxic effect in acute cases; the toxin acts through the vasomotor system as the affected areas are so constant; and, finally, local irritation and a poor peripheral circulation sometimes determine the site of lesions.

Lupus Erythematosus Cured by X-rays.—R. F. Woods³ (Philadelphia) reports a cure of a case of lupus erythematosus of the cheek, the lesion being the size of a silver half-dollar. Decided improvement was observed after the second exposure, six sittings of 10 minutes each, seeming to have cured the disease.

The X-ray and the Finsen Light in the Treatment of Lupus.—A. D. Rockwell⁴ (New York) reports a case in which both the *x*-rays and the Finsen light were used, opening up the question so frequently asked, Which of the two is the better and more effective method? The actinic rays possess one manifest advantage over the *x*-rays in that they are more benignant in action. Both rays cause chemical changes and fluorescence, as well as dermatitis and pigmentation, but the dermatitis the result of the light is soon produced and undergoes rapid resolution, while *x*-ray burns are both slower to develop and slower to heal. The two forms of rays do not differ so much in kind as in degree—in the frequency and intensity of the vibrations. This applies, moreover, to

¹ Rev. de la Tuberc., July, 1902.

² Am Jour. Med. Sci., Dec., 1902.

³ Brit. Med. Jour., Oct. 25, 1902.

⁴ Med. Rec., April 11, 1903.

all the various electric modalities. In a case of lupus narrated the Finsen light failed to cure beyond a certain point, whereas the *x*-ray then acted most happily, 45 exposures being given over a period of 4 months.

The Finsen apparatus in lupus is described by George G. Hopkins¹ (Brooklyn), who refers to a visit to Finsen's Institute in Copenhagen, and gives a photograph of one of Finsen's striking cases of lupus before and after treatment; also photographs of Finsen's lamp and of Bang's (much simpler) lamp, and states that he is employing the Finsen lamp in Brooklyn with "a very satisfactory degree of success."

Treatment of Lupus by X-rays and Ultra-violet Rays.—H. E. Gamlin² (West Hartlepool) first directs attention to the importance of details, which are of vital importance in the attainment of the end desired. He has adopted the plan of giving sittings 2 or 3 times a week, lasting from 3 to 5 minutes, using a 14-inch coil with a 6 to 8 amperage and a 40 pressure. In the beginning he always uses a low tube. The primary object is to produce a mild reaction, which when obtained must be steadily and evenly maintained and its extent determined slowly by discretion in the regulation of tubes and exposures. The author is greatly in favor of the use of low resisting tubes for superficial surfaces; they give more speedy and sure results than hard tubes. In dealing with some cases the ultra-violet rays (lupus lamp) are combined with the *x*-rays. For small areas the lupus lamp is most effective, but the skin must be smeared with vaselin (which appears to increase the value of the light), ice and adequate pressure also being used. Ten cases of lupus (with photographs) are recorded.

Notes on a Few Cases of Lupus Treated in the Glasgow Western Infirmary.—D. J. Mackintosh³ records that the Finsen treatment was employed, and that 65 cases were treated during the previous year, all of which but one were markedly improved, while 10 were dismissed as cured after a course of treatment varying from 3 to 6 months. At the commencement a test exposure of 10 minutes to a current of 10 amperes is given, and if the reaction be not too violent, the sitting is increased to 15 or 20 minutes, and the current to 12 amperes, care being taken that the part to be treated is kept closely applied to the lamp, to insure its being rendered as anemic as possible. The greater the reaction to the test exposure, the greater the hope of ultimate cure. In most cases the reaction follows immediately, but the patient is not conscious of any unusual sensation until some hours afterward. The place of the high-frequency current in the treatment of lupus has not yet been established.

The X-rays in Lupus, Rodent Ulcer, and Other Skin Diseases.—Morris and Dore,⁴ who have on a previous occasion given their views in the same publication, conclude from more recent work that the *x*-ray treatment, while it has a well-defined sphere of usefulness, is in the case of lupus vulgaris much inferior in curative efficacy to Finsen's light treatment. The use of the *x*-rays, however, supplies certain deficiencies

¹ Jour. Am. Med. Assoc., Sept. 13, 1902.

³ Glasgow Med. Jour., Dec., 1902.

² Brit. Med. Jour., June 6, 1903.

⁴ Brit. Med. Jour., June 6, 1903.

of the Finsen light treatment, as they can be applied to cavities inaccessible to the latter. In the treatment of lupus of mucous membranes the *x*-rays were more effective, and also for the healing of ulcerated areas, as well as for the relief of pain. As to the permanency of the good results obtained, opinions must be cautiously expressed. In rodent ulcer, relapse, after a varying period, is the rule.

The Light Treatment of Lupus and Rodent Ulcer.—A. J. Harrison and W. K. Wills¹ give results obtained in the Bristol General Hospital in 1901 and 1902. At first two Lortet-Genoud lamps made by Marshall & Woods, of London, and later two lamps made by Miller, were employed. The current used was an interrupted one—5 to 10 amperes, about 12 volts; and the time of sitting at the lamps, 5 to 20 minutes. The report covers 42 cases of lupus vulgaris, 3 of lupus erythematosus, 12 of rodent ulcer, and other miscellaneous cases. In the lupus cases almost all were benefited or greatly improved; a small percentage only were unsatisfactory. Two out of the three lupus erythematosus cases were improved, but made more rapid progress under *x*-ray treatment. The 12 cases of rodent ulcer were treated chiefly with *x*-rays and were markedly benefited.

Histology of X-rayed Lupus Vulgaris.—George Pernet² (London) found in the skin the following changes: Disjunction and some disintegration of the collagen with a certain amount of collastin change. In many instances the elastin fibers were broken up, the greater part of this tissue being destroyed. There were infiltration and signs of disintegration about the sweat-glands, with apparently disappearance of the hair-follicles and sebaceous glands. Some of the subcutaneous fat-cells were irregular and their nuclei gone; others were normal. Numerous plasma-cells were present, some being deep down in subjacent muscle-tissue, which had been here and there disintegrated by granulomatous new-growth.

The same subject has also been studied by J. M. H. MacLeod³ (London), whose findings in 2 cases may be summarized as follows: that the action of the actinic rays from an arc lamp (London Hospital modification of the Lortet-Genoud lamp) on the granuloma of lupus is essentially destructive, and is simply the result of an ordinary inflammatory reaction; that the effect of the rays on the surrounding healthy tissue is "negligible," so that doubtful tissue near by may be safely exposed without danger of injury or scarring; that the destructive process, if the rays are judiciously employed, is not of such an intensity as to prevent subsequent repair; that the process of construction is capable of replacing the destroyed granuloma with healthy fibrous tissue, forming a pliable scar, and the epidermis completely recovers from the edema caused by the action of the rays; hence from the histologic point of view the treatment of lupus and other granulomatous affections of the skin by the actinic rays is an ideal one.

Case of Lupus Vulgaris Treated with Static Brush Discharge.—Gibson⁴ gives the case of a negress aged 21, with a family history of tuber-

¹ Jour. of Cutan. Dis., June, 1903, p. 295.

² Ibid.

³ Brit. Med. Jour., Oct. 25, 1902.

⁴ Jour. of Advanced Therapeutics, vol. xx, No. 1, 1902.

culosis. The disease had existed 10 years and had been actively treated in a number of clinics. The nose and upper lip were the seat of a deep ulcer and were heavily crusted. The cheeks were much swollen. The patient was placed on an insulated platform and connected with the negative side of the static machine, while a wooden electrode connected with the grounding chain was placed as close to the face as the patient could bear. A strong brush discharge was kept up for 15 to 20 minutes, 20 applications being made. Three months later the ulceration had disappeared and the skin over the affected area was soft and pliant and had the appearance of being made up of innumerable small scars.

Four Cases of Lupus Treated with Radium.—Danlos¹ believes that this substance will have an important future (after the price of the metal is reduced) in lupus and carcinoma. The results with radium of weak activity (1000 to 1800) have been fairly favorable, but relapses have occurred. With the metal of 2500 to 19,000 the results have been better. With the metal of high intensity the contact need only be short. Two methods of its employment have been used: one, the dry method, or that of repeated and short sittings; and the other, the ulcerative method, or that of prolonged application. A case reported by Hallopeau, of Paris, showed an ulceration after an application of 19,000 activity for 120 hours which was very slow to heal. The *x*-rays emanating from this metal seem to be a combination of *x*-rays and cathode rays.

Lupus Treatment by Lang's Hot-air Method.—L. Spitzer² states that Lang's apparatus is similar in principle to Paquelin's cautery, and is heated by benzine, and that the treatment is not followed by unpleasant consequences to the patient. Its advantages are rapid healing; good cosmetic result, the scars being smooth, soft, and supple; possibility of application to even large areas; and the simplicity and ease of application. Should more than one treatment be necessary, there may still be hope of a successful result and permanent cure.

The Treatment of Lupus Vulgaris with Potassium Permanganate.—Hallopeau and Fouquet³ record the case of a patient with a severe and intractable lupus of the leg which had been treated by local applications of permanganate of potash and curement. Compresses wet with a solution of the strength of 1 : 120 were constantly applied to the affected parts, under the influence of which the ulcerations, which had resisted treatment for years, completely cicatrized and the vegetations disappeared. This application was well borne, although in a case of lupus of the face it produced a subacute dermatitis.

J. Hall-Edwards⁴ (Birmingham) states that during his observations of a large number of cases treated by means of the *x*-rays he has tried the action of a number of drugs in connection with the *x*-rays. Some were used for the purpose of bringing about a more speedy reaction; others with the object of limiting the inflammation. During these experiments he was struck by the good effects produced by potassium permanganate, not only as an adjunct to *x*-ray treatment, but in clearing

¹ Ann. de Derm. et de Syph., July, 1902.

² Brit. Jour. of Derm., April, 1903.

³ Ann. de Derm. et de Syph., 1902, No 1.

⁴ Brit. Med. Jour., June 27, 1903.

up patches left after the use of the rays. In many cases of lupus treated by the *x*-rays the centers of the patches rapidly get well while the edges continue to spread slowly, and in these cases the author has had his best results. He uses a saturated solution of the drug (one dram to the ounce of water), applied, in nonulcerative cases, with a brush, after thoroughly cleansing the skin, the applications repeated daily or every other day until relief is obtained.

Case of Blastomycosis of the Skin from Accidental Inoculation.

—Newton Evans¹ reports a case occurring in a physician, aged 28, who had always had unusually good health. At an autopsy on a case of systemic blastomycosis he wounded himself on the finger with the point of a needle. The wound was insignificant and apparently healed, but at the end of a week a small pustule appeared at the site. This was treated, but continued to recur after repeated incisions, and a nodule formed, and the finger and axillary glands swelled. The wound became granulomatous and an open sore with miliary abscesses developed, from which cultures were made showing typical mold-like fungus as existed in the original case reported by Ormsby and Miller in the "Journal of Cutaneous Diseases," March, 1903. Microscopic examination of smeared specimens failed to reveal any adult parasites. Recovery occurred 2 months later.

Isadore Dyer² also reports a case of this new and interesting disease, which is worthy of record because of its typical characteristics, its long duration, in spite of active treatment, its gradual but progressive extension, the age of the patient (77 years), and the general distribution of the lesions. The chief lesion was a kidney-shaped patch, 4 by 2 inches in diameter, with elevated fungating borders, with offensive ichorous discharge and some crusting. The lesions had been chiefly interesting on account of the negative findings. The heart and lungs were normal, with no congenital defect. The amount of subcutaneous fat was exceedingly small. The skin of the lower abdomen was 3 times thicker than that of the upper abdomen. On section it was very firm and fibrous, and no serum exuded from the cut surface. The author is inclined to regard the condition as the result of an autointoxication from improper functional activity of the gastrointestinal tract.

Dermatitis Verrucosa Probably Caused by Bacillus Coli Communis.—Anthony³ reports a case in which a lesion clinically resembling tuberculosis verrucosa cutis followed a burn with muriatic acid. At the base of the thumb was a patch of vegetating papillas surrounded by a red zone 1 cm. wide, in which were numerous small abscesses from which a drop of pus could be evacuated by pressure; pus could also be squeezed from the apices of many of the papillas. Blastomycosis, tuberculosis verrucosa cutis, and streptococcal dermatitis were excluded. With ordinary stains a short bacillus was found in the pus which was fully identified as the colon bacillus. Sections showed an enormous proliferation of the epithelium of the epidermis, together with here and there formations

¹ Jour. Am. Med. Assoc., June 27, 1903.

² Amer. Med., Oct. 25, 1902.

³ Jour. Cutan. and Gen.-Urin. Dis., Aug., 1902.

resembling the epithelial pearls found in cancer of the skin. Small abscesses filled with polynuclear leukocytes were also present.

Treatment of Tuberculous Cutaneous Ulcers with Balsam of Peru.—G. Silva¹ records 10 cases cured by this drug which had resisted all other treatment. The balsam was painted over the lesion and a dry, aseptic gauze bandage applied. The author attributes the curative value of the remedy to its slightly irritating, antiseptic, and protective qualities.

Frambesia in Fowls.—J. A. L. Calder² states that the disease in man and fowls appears to be identical. The disease attacks chickens chiefly, and its common seat is the head, rarely the feet or legs. In the fowl the disease is of a more virulent type and usually causes death. The author has not been successful in transferring the disease from man to fowl or vice versa. Any connection of yaws (frambesia) and syphilis is in the opinion of the author accidental; in short, they are different, notwithstanding some authors to the contrary.

T. Colcott Fox³ states that he received a number of sections of supposed yaws in fowls from the West Indies, but the growths were undoubtedly *molluscum contagiosum*, and corresponded with those recognized in fowls and other birds in Europe. Clinically they resembled flattish brown warts rather than the lesions commonly observed in man.

Rhinoscleroma after Trauma.—Hrach⁴ (Przemysl) describes the case of a man 24 years of age in whom this disease seemed to follow a contusion of the nose. The left nostril was invaded with the usual dense, hard, circumscribed growth which commonly characterizes this disease. A small portion was excised for microscopic examination, the wound healing rapidly. The microscope showed in the somewhat exuberant connective tissue with disseminated granulation cells, distinct vacuolated and hyaline degenerated cells, in which the short bacilli of rhinoscleroma were discernible. The infection occurred through trauma, and on this account the case is very rare.

Cutaneous Angiomas and Their Significance in the Diagnosis of Malignant Disease.—Douglas Symmers⁵ (Philadelphia) gives a general summary of the work that has been done on this subject, especially on the part of German observers, together with his own investigations, and concludes that skin angiomas bear no relationship to malignant disease, and that their existence, even in large numbers, is not to be viewed with any degree of alarm so far as cancer is concerned.

A Diagnostic Examination of 150 Cases of Leprosy.—J. T. McDonald⁶ (Hawaii) first states that the disease in Hawaii is on the decline, thus proving the value of segregation established over 30 years ago. The method of apprehending and dealing with leper suspects and other practical points are referred to in detail. The following is a summary of the article: (1) The microscope is the chief agent in the final diagnosis of leprosy. No patient should be committed to a segregated colony

¹ Rif. Med., Nov. 29, 1902.

³ Ibid., Feb. 28, 1903.

⁵ Med. News, Dec. 27, 1902.

² Brit. Med. Jour., Feb. 14, 1903.

⁴ Wien. med. Woch., March 28, 1903.

⁶ Jour. Am. Med. Assoc., June 6, 1903.

without a bacteriologic demonstration of the disease. (2) Of clinical symptoms, macules, chiefly leukodermic spots, are found in 89 % of all cases. (3) The leprosy nodule found in 74 % is the one chief distinguishing lesion of skin leprosy. (4) Thinning or complete loss of eyebrows and lashes is present in 63 %. (5) Atrophic changes in hands and forearms with retraction and contraction of fingers and enlarged ulnar nerve in 32 %, a leading feature of nerve leprosy. (6) The plantar ulcer found in 26 %, usually on the ball of the foot. (7) Absorption of phalanges in 16 %, with occasional spontaneous amputation. (8) Elephantiasis of hands and feet in 16 %. (9) Facial paralysis in 11 %. (10) The entire body should be carefully tested for anesthetic areas. (11) Several of the above symptoms can be found in some slight degree at least in every leprous subject.

On Spontaneous and Scar Keloid.—M. A. Chlenov,¹ after discussing the views held by observers as to the nature and classification of keloids, describes a case of spontaneous keloid in which there were 431 growths, 14 being upon the genital organs. Baths (93° to 100° F.); inunction with 30 % resorcin ointment; hypodermatic injections of arsenic (60 injections of a 1 % solution), and phototherapy by means of a Loret-Genoud lamp (only 2 treatments to 2 tumors), were employed. The resorcin ointment seemed to soften the tumors, and the light treatment had no effect on one tumor, but the other grew distinctly larger. The author concludes that hypertropical scars should not be included among the keloids; that the distinction between primary and secondary keloids cannot be strictly maintained; that the histologic changes in keloid growths consist in hypertrophy of the fibrous tissue (with destruction of the elastic tissue) along the bloodvessels; that the chief cause of the appearance of keloid is a special predisposition of the individual, family, or race; and, finally, that the treatment is unsatisfactory. [The long-continued use of the Röntgen rays, at intervals, can be commended in keloid.]

Paget's Disease of the Nipple.—Matzenauer² investigated the question of the nature of this disease, especially its relation to eczema, and concludes from a study of the histopathology that it is in no way related to eczema. The process is, in his opinion, a carcinoma of the skin from the very beginning.

Benign Cystic Epithelioma.—M. B. Hartzell³ reports 2 cases presenting unusual features, the latter consisting in the fact that the patches were circumscribed and that the ulceration resembled that of ordinary epithelioma. The author concludes that it seems probable that all the cases reported with a variety of names really represent three affections, presenting lesions which can be distinguished from one another only with the aid of the microscope, but which are quite distinct in their nature and origin; first, benign cystic epithelioma, in which the lesions are usually but not always situated on the face, and have their origin in the basal layer of the epidermis and the external root-sheath of the

¹ Brit. Jour. of Derm., April, 1903, p. 156.

² Monats. f. prak. Derm., Bd. xxxv, No. 5. · ³ Am. Jour. Med. Sci., Sept., 1902.

hair; second, cystadenoma, in which the eruption occurs upon the trunk, the growths starting in the sweat-gland apparatus; and, third, hemangioendothelioma, likewise situated on the trunk, but originating in a proliferation of the endothelium of the bloodvessels.

Röntgen Rays in Skin Cancer.—J. F. Rinehart¹ (California) gives a brief summary of the history of *x*-ray treatment in varied diseases invading the skin, and states his own experience with skin cancer—in effect, that he has been unable to obtain any good results until inflammatory reaction was set up. He is of the opinion that it is the light and not the inflammation that causes the death of the cancer-cells, for simple inflammation produced by caustics in and around cancerous sores does not cause the death of the process. He prefers a low vacuum tube giving a soft light, thus supporting Thompson's statement that a low vacuum tube produces more effect upon the skin than a high vacuum tube.

Stopford Taylor² (Liverpool) gives the notes of 6 cases, all mild forms of cutaneous carcinoma of the face, accompanied with photographs, in which the results were good. From his studies Taylor arrived at the conclusion that (1) the *x*-rays were especially indicated in cases of inoperable cancer of the skin; (2) that the best results were obtained when the disease is confined to the soft parts; (3) that in favorable results patients should be warned that a recurrence may take place.

A. R. Robinson³ (New York), in an article read before the Canadian Medical Association, concludes that some cases of advanced epithelioma are incurable except by the rays. The majority of the cases reported as cured by *x*-rays could have been cured much more quickly by the knife or caustics, especially by the latter. The scar is sometimes better after the ray treatment than after the use of caustics, but for the majority of cases caustics are preferable, as their action is definite and there is greater saving of time to the patient. In many cases of cutaneous cancer the ray is a valuable agent in combination with other methods, and when the disease is situated around the important bloodvessels it is the only proper agent to employ, except in some cases on the extremities, where amputation would be advisable. All cases of carcinoma of the breast, except those seen in a very early stage, should be treated by the *x*-rays before resorting to the knife. The rays should be used in all inoperable cases, and in all cases after amputation has taken place.

Notes on X-ray Treatment of Cancer.—G. E. Pfahler⁴ (Philadelphia) reports a number of successful cases, with photographs, the disease occupying varied regions of the general surface, and draws conclusions much like those of other observers who have reported favorably on the method.

Hyde, Montgomery, and Ormsby⁵ likewise present an article on the same subject, with an unusually large number of exceptionally clear and good photographs, the work done including a variety of disease invading

¹ Am. Jour. Med. Sci., July, 1902. ² Liverpool Med.-Chir. Jour., Oct., 1902.

³ Canad. Jour. Med. and Surg., Dec., 1902.

⁴ Jour. Am. Med. Assoc., Jan. 3, 1903.

⁵ Ibid.

the skin, such as carcinoma (55 cases); tuberculosis (14 cases); and psoriasis (32 cases). A word of caution is given in its use at present in acne rosacea, folliculitis, and suppurating wounds, and the like, and belief is expressed that its employment should be reserved chiefly for those cases in which better known and better controlled methods are not successful. It is not yet possible to draw conclusions as to the comparative value of radiotherapy and phototherapy. In the experience of the authors in lupus erythematosus phototherapy has repeatedly given them excellent results when the *x*-rays have failed altogether or aggravated the condition. Judging from their experience and from the larger experience of Finsen and others in the treatment of tuberculosis of the skin, they believe that in this disease phototherapy gives in the end results as rapid as those obtained with the *x*-rays, with better cosmetic effects, and without danger of deep burns.

Further Observations upon the Treatment of Rodent Ulcer.—J. H. Sequeira¹ (London), in referring to the changes produced in the growth characterizing this disease, says that changes are observed in the nuclei and in the protoplasm, the former becoming disorganized and the cell-plasma breaking up, often becoming fatty. These changes have been noted in all the cases examined microscopically. The author also refers to the work in this direction done by Spencer Scott on tissue before and after treatment, which confirms his own investigations. At the same time that the above-mentioned changes in the nuclei and protoplasm are taking place, infiltration of leukocytes goes on, but it is impossible to state whether the damage done to the epithelial cells is the direct effect of the ray or whether the effect is indirect and due to leukocytic infiltration or to some obscure nervous and vascular changes. While the destruction of the epithelial cells is going on, there is a marked activity of the connective-tissue elements, which is well illustrated by the rapid filling up of cavities left by the rodent ulceration. Where the growth is small, excision is advised, which should always be complete; scraping and cauterization are so likely to be followed by recurrence that they should not be undertaken. Sequeira is accustomed to apply the rays on alternate days in the slighter cases, and daily in the more extensive ones, and he still uses tubes which spark at from 4 to 6 inches, but finds that the therapeutic value of the tubes is a very variable thing, and one which at present it is impossible to explain. High tubes are valuable, as the rays can be applied until there is a definite inflammatory reaction. Actual "burning" is not necessary, and some of the best results are obtained without any inflammatory reaction at all.

The Curative Powers of the X-rays upon Lupus and Malignant Growths, with Report of Cases.—Thomas J. Buchanan² (Philadelphia) goes into the matter of the "technic of the *x*-ray therapy," and "how do the rays cure carcinoma," and draws conclusions as follows: Superficial carcinomas, lupus, rodent ulcer, eczema, and many kindred skin affections can positively, in many instances, be cured with the *x*-rays. Deep-seated carcinomas can sometimes be retarded and the pain very much

¹ Brit. Med. Jour., June 6, 1903.

² Phila. Med. Jour., April 25, 1903.

lessered by means of the *x*-rays, but that such patients can be permanently cured is, as yet, not demonstrated. A tube of medium-high vacuum is better suited for *x*-ray therapy than a tube of low power, particularly for deep-seated carcinomas. The part exposed should never be nearer the tube than 12 inches. An exposure should never last longer than 5 to 10 minutes at one sitting, and an interval of 3 or 4 days should intervene between sittings. In order to effect a cure it is neither necessary to produce a burn nor to cause any reaction whatever. The operator should be skilled in the use of the apparatus. After the suspension of treatment carcinomas show a strong disposition to return quickly.

David Morgan¹ illustrates his cases (of lupus and carcinoma of the skin) with photographs taken before and after treatment, the results being particularly satisfactory, especially the case of a serpiginous rodent ulcer of the side of the head of 20 years' duration, which recovered in 3 months. A 10-inch coil and a tube of medium resistance were used and placed as near the patient as possible, the exposures varying from 10 to 20 minutes 4 times a week. For the light treatment a modification of the Lortet-Genoud lamp, an ordinary 10-ampere automatic arc lamp with water-jacket and Finsen compressor were employed.

Charles W. Allen² (New York) gives his experience with a number of miscellaneous diseases, including cancer, and expresses himself as favorably disposed to the treatment. His preference is for the static machine for therapeutic purposes. As regards the occurrence of toxic symptoms, he has observed joint and muscular pains of a rheumatic character during treatment. As to burns from the *x*-ray, when an erythema appears the warning is usually too late, because burning has already taken place.

The Effect of the Röntgen Ray upon the Skin in Normal and Diseased Conditions.—Scholtz,³ as the result of an experimental, histologic, and clinical study of the effects of the Röntgen ray upon the skin in healthy and diseased conditions, concludes as follows: The Röntgen rays themselves are the only, or at least the essentially, active factor in producing the effects peculiar to them. Their effect upon the skin occurs not only at the point of their entrance, but also at the place of exit, and appears always only after some days, reaching its acme, as a rule, after some weeks. A bactericidal effect occurs only to an insignificant degree, and scarcely plays any role therapeutically. The rays affect preferably, or exclusively, the cell elements of the skin, which undergo a slow degeneration. This degeneration is manifest chiefly in the epithelial cells, and in a less degree in the cells of the glandular organs, of the vessels of the musculature, and of the connective tissue. The phenomena of this degeneration are of a manifold kind, affecting the nucleus as well as the cell-body. As soon as the degeneration of the cell-elements has reached a certain degree, phenomena of inflammatory reaction appear, as dilation of the vessels, imbibition of serum by the tissues, and abundant emigra-

¹ Liverpool Med.-Chir. Jour., Oct., 1902.

² Jour. Am. Med. Assoc., Feb. 21, 1903.

³ Arch. f. Derm. u. Syph., Bd. lix, Heft 1, 2, 3

tion of white blood-corpuscles. The changes in the vessels probably have much to do with the further development and the slow healing of the ulcerations. The author employed the Röntgen-ray treatment in about 200 cases of various forms of disease of the skin, with more or less favorable results. In lupus vulgaris this method of treatment is preferable to the methods hitherto used, not only because it is painless and gives good cosmetic results, but because it is followed by definite cure. In cases of lupus erythematosus vigorously treated excellent cosmetic results were obtained, but recurrences took place after some months. In cases treated mildly for some months an apparently complete cure was obtained. In the treatment of diseases of the scalp and beard by this agent, the good results are chiefly due to its very excellent depilatory effect. In favus and trichophytosis its bactericidal effect is not to be taken into account. In sycosis and folliculitis barbæ, apart from its depilatory action, the ray seems to exert a favorable influence upon the tissues. In mild cases definite cure may follow its use, but in severe ones relapses occur with the return of the hair. In the various forms of acne the treatment was useful, but not more so than those formerly employed. In eczema favorable results were frequently obtained. In all the cases of psoriasis treated the Röntgen ray exerted a remarkable influence upon the eruption. In most patients an almost complete, and in some an absolute, disappearance of the disease took place in a comparatively short time; but relapses were not prevented. In a case of carcinoma of the nose no carcinomatous tissue could be demonstrated with the microscope after treatment for some weeks. The author concludes that this method of treatment is a very interesting and active one in diseases of the skin, and that with improvement in the technic still further advances will be made in its use.

Experimental Investigations with Röntgen Rays upon Living Tissue.—J. Rudis-Jieinsky¹ (Cedar Rapids) experimented with 10 guineapigs and 10 rabbits, employing intense irritation daily, first for 10 seconds and later for 10 minutes, the low-vacuum tube being at the distance of 6 inches in the beginning and a little less at the end of the experiment. Microscopic examination of the destructive process, or so-called burn, showed a special inflammatory action with a development of fibrous tissue, with thickening of the walls of the bloodvessels, especially the intima, the lumen being contracted. In the opinion of the author, the vasomotor fibers bear the brunt of the attack of the irritation, and we have, perhaps, a nerve affection or atrophic neurosis with mortification proper. Death of tissues in raying is caused by permanent stasis in the bloodvessels, giving us the proof that certain *x*-rays are similar in their actinic properties to the rays of light at the violet rays of the spectrum, and that various tissues and cells react differently, their resistance being regulated, so to say, according to the quality of the plasma and the degree of the liquid they contain. Paraffin and wax offer no protection to *x*-rays, but lead, being opaque, offers the best protection; a covering

¹ N. Y. Med. Jour., Nov. 15, 1902

of sheet-rubber over the lead-foil will prevent possible unpleasant shocks, as experiments have shown.

MISCELLANEOUS.

Thyroid Extract in Pruritus Accompanying Jaundice.—Gilbert and Hercher¹ state that the itching is due to the action of the bile-salts on the termination of the nerves, and that this drug is useful in this disease. They have shown by experiments that solution of the bile-salts mixed with thyroid extract and injected into the veins of a rabbit's ear are much less toxic in their effects than are the pure solutions of the salts.

Pruritus and Fissures of the Anus.—W. C. Black² speaks of the value of equal parts of ichthylol and glycerin painted on the parts after stretching the sphincter until completely relaxed. He has also had good results follow the injection of ichthylol just within the sphincter, 2 or 3 times a day.

Acids Internally in Pruritus.—H. Leo³ (Bonn) advises a trial of hydrochloric or sulfuric acid in all cases of generalized pruritus of obscure origin, whether there be alkalinity of the urine or not. He reports cases in which it has succeeded, in some the urine being alkaline, in others normal. The acid is administered in appropriate doses at short intervals,—every 2 hours. In some cases, of course, the treatment proves unsuccessful.

Du Castel⁴ finds lactic acid of value in this disease, both in children and in old persons. For little children the dose is from 10 to 16 drops of a 1 % solution, in divided doses through the 24 hours, to be increased if the drug is tolerated.

"Blue Toes."—Arthur Hall⁵ (Sheffield) relates several cases of a curious blue discoloration of the skin between the toes, observed chiefly in young girls. The color was a peacock-blue, which did not disappear on washing or rubbing. Chromidrosis, bacterial decomposition of the sweat by *Bacillus pyocyaneus*, and factitious production were all suggested as possible diagnosis. After long-continued observation in several cases, and chemical analysis, it was shown that the discoloration was due to the black dye of the stockings and the acid sweat. The dye was of the nature of azo-black. When boiled out, it dissolved as a purple color. Treated with acid, various shades of bright blue or peacock-blue appeared, varying with the acid employed.

Pathology of Chromidrosis.—M. L. Heidingsfeld⁶ (Cincinnati) refers to 8 cases of red chromidrosis that he observed during the past 2 years, in most of which there was not only a reddish discoloration of the incrusted hairs, but also of the superimposed garments. From his cases, as well as others in the literature, these forms of reddish discoloration are readily contagious, and owe their cause to a local infection entering from without. Great diversity of opinion exists as to the true nature of

¹ Le Bull. Méd., July 30, 1902.

² Practitioner, Dec., 1902.

³ Semaine Méd., xxii, No. 51.

⁴ N. Y. Med. Jour., Aug. 2, 1902.

⁵ Brit. Jour. of Derm., Nov., 1902.

⁶ Jour. Am. Med. Assoc., Dec. 13, 1902.

the parasite, and this led the author to make culture experiments. He believes that it is probably due to some form of erythromicrocococcus-tetragenus infection from individual to individual, and yielding to anti-parasitic remedies. But of a different nature are the other forms of chromidrosis, as met chiefly on the face, particularly the eyelids, often involved with uterine disturbance or hysteria. In nearly all these cases the attack comes on suddenly without apparent cause, and persists usually for a few years in an intermittent form, the color being usually yellowish, reddish, or bluish. In the light of the author's investigation in one case of yellowish-brown staining of the skin, the conclusion reached was that the disease (excluding red forms) is an anomaly of pigmentation and not glandular secretion.

Treatment of Milium.—Carl Gerson¹ recommends the application of pure liquefied carbolic acid, after cleansing the skin with ether or benzin. The skin is to be tightly stretched over the lesions and the acid applied with a minute pledge of cotton pressed on firmly for about 15 seconds. Usually one application suffices. At the end of 5 or 6 days the cauterized epidermis, together with the milia, are cast off without leaving scar.

Dermatoses Occurring in Exophthalmic Goiter.—J. N. Hyde and E. L. McEwen² give the notes of 4 cases in which exophthalmic goiter existed with hidrocystoma, telangiectasis, pruritus, and pruritus and angioneurotic edema. A review of the literature of this disease in which there coexisted cutaneous diseases shows that hyperhidrosis is the most frequent, and next in frequency pigmentary changes, myxedema, edema, and scleroderma. Many other diseases of the skin are reported, the list being long and the diseases diverse. Accidental diseases, as eczema and the like, are excluded.

Partial Gangrene Following Injection of an Oily Solution of Mercury Biniodid.—Pflüger³ (Berne) concludes from this case that such solutions should not be used intramuscularly, but rather subcutaneously, thus minimizing the degree of gangrene, should this occur.

Dependence of Skin Affections upon Nutritive Disturbances.—W. R. I. Dalton⁴ considers that cutaneous diseases are due to nutritive disturbances, or defective degenerative metabolism, producing a lethargic condition of the skin, deficient stimulation of the nerve-twigs supplying the glands, and that bacterial agencies cause septic and putrefactive changes in the alimentary canal; and, furthermore, that inanimate toxins maintain selective affinities for the tissues, exerting their action upon the primordial protoplastic group of cells. A formula much employed consists of naphthalin, 1 gr.; ipecac, $\frac{1}{2}$ gr.; willow charcoal, $1\frac{1}{2}$ gr.; calomel, strychnin, and pilocarpin, of each $\frac{1}{100}$ gr. The bowels, moreover, are to be kept open in connection with the above, the whole aim of treatment being to change the environment of pathogenic organisms by lessening their virulent activity.

¹ Berl. klin. Woch., Dec. 8, 1902.

Am. Jour. Med. Sci., June, 1903.

² Arch. f. Derm. u. Syph., 1902, Bd. ix, Heft 3.

⁴ N. Y. Med. Jour., Nov. 1, 1902.

THERAPEUTICS.

A Brief Review of Finsen's Phototherapy.—P. Christian Clemens¹ gives a concise and excellent review of the work done by Finsen and others during the past 8 years, much of which is unknown to most English and American readers. Finsen published his first investigations concerning the action of light upon the skin about 8 years ago, the results obtained being essentially the same as those observed by Widmark, of Stockholm, and others—namely, that sunburn is not caused by the heat of the sun, but is due to the action of the ultra-violet, or so-called chemical, rays. The blue and the ultra-violet rays were proved to be capable of exciting an inflammation upon a healthy unprotected skin, and it was this observation that led Finsen to conclude that their exclusion would benefit certain inflammatory diseases of the skin, notably smallpox. Svendsen, of Bergen, put this to test, and found the theory to be not only theoretically but empirically correct. Finsen's experiments in the production of photochemical inflammations (by the chemical rays of light) upon his own skin showed that the inflammation thus incited differed from other kinds of inflammation in that it was followed by a marked pigmentation of the skin of several months' duration; that it does not appear at once, as does a burn, but has its maximum in one or two days after exposure; and that it appears only on those parts of the skin which have been exposed to the light, while heat rays are capable also of acting through the clothing. Experiments with the tail of a tadpole under the microscope showed that in actinic inflammations ten minutes' exposure caused the blood-current to become slow, with the presence of many leukocytes, the blood-current a little later being completely obstructed (*stasis*) by red and white corpuscles, with many leukocytes outside of the vessels; the red corpuscles lost their characteristic oval shape (of the frog) and became stubby and contracted.

Valdemar Bie, Finsen's first assistant, at this date found that all the rays of the spectrum, from the red upward, hamper the development of microorganisms; and that their ability to kill bacteria rises somewhat uniformly with the exponent of refraction, the effect being due chiefly to the violet and ultra-violet rays. Other work of this kind has been done by A. L. Larsen and Sophus Bang.

In Denmark, Sweden, and Scandinavia generally the value of the red-light treatment of smallpox seems to be accepted without question. Finsen says that the exclusion of the actinic rays must be complete. The patient must remain in the red light until the lesions are dried up, for even the slightest exposure to daylight can bring about suppuration and its sequels. The treatment should be commenced as early as possible in the beginning of the disease. The result will be that suppuration is prevented, the course of the disease shortened, and the patient cured without pitting. Svendsen's, Backmann's, and Feilberg's experiments were all favorable to this plan of treatment. In 1899 alone about 150 cases so treated had been reported.

¹ Chicago Med. Recorder, Sept., 1902.

Experiments showing the power of the chemical rays to penetrate tissues, the value of light for medical purposes, and treatment by concentrated light are set forth by the author, together with a table of statistics taken from Finsen's official report for the year 1900, the favorable results of which are now pretty well known to the profession at large.

In the latest bulletin of the Finsen Institute a description is given of the chemical light bath as proposed by Finsen, showing wherein it differs from the Kellogg electric light bath now much in vogue in Germany. Finsen uses either sunlight or electric light, the patient walking naked in a court of bright sunlight, where everything possible is done to keep the temperature down so as not to make it a sweat-bath. These baths produce a pleasant prickling and slight sensation of heat on the skin, the result being that dilation of the capillaries is produced, insuring a greater blood-supply and in consequence a better nourishment of the skin. It has also been shown that the chemical rays are powerful counterirritants, and it is difficult to foretell the future use of these chemical light baths. [This exposition of the labors of the Danes, Swedes, and Norwegians during the past 8 years, as set forth in the article under review, is most interesting and important, and deserves to be brought to the attention of the profession all over the world. The experiments and valuable results in the treatment of smallpox and prevention of scarring are most convincing, notwithstanding that some observers in this country have failed in a very few cases to obtain the expected beneficial results. Finsen lays great stress upon the proper carrying out of the technic, without which there will be failure. The treatment is not only worthy of an extended trial, but should be insisted on, in all our municipal hospitals where smallpox cases are treated.]

Radiotherapy in Diseases of the Skin.—H. R. Varney¹ (Detroit), in an interesting article on "Results in Radiotherapy," gives his experience with a number of cutaneous diseases, including 12 cases of lupus treated from 1900 to 1903, 10 of which were clinically cured, no other treatment than the rays being given. Most gratifying results were obtained in acne, but only the indurated pustular form of the disease that had proved rebellious to all remedies was treated. If the treatment is carried to the point of a production of erythema and stiffening of the skin, the peeling which follows will aid in the removal of pits and scars from old lesions. There was no recurrence in these cases. After prolonged treatment with 2 cases of hypertrichosis, the author is not favorably inclined to its use in this disease. Experience with keloid and verruca has been favorable, and the same remark applies to patches of infiltrated eczema. Sycosis has yielded rapidly and with gratifying results; so also have the pittings from smallpox, though by no means so rapidly. A case of diffuse scleroderma disappeared in a short period, with only a slight tendency to recurrence.

Radio-praxis—Henry G. Piffard² (New York) says that if we compare the Röntgen rays with the ultra-violet radiations some resemblances will be noted, but still some notable differences will be observed; thus

¹ Jour. Am. Med. Assoc., June 6, 1903.

² Med. Rec., March 7, 1903.

(1) the x -rays cannot be reflected, refracted, or polarized, whereas the ultra-violet rays can be reflected, refracted, and polarized. (2) The x -rays can penetrate and traverse many bodies that will not permit the passage of luminous rays; for example, wood, aluminum, etc. The ultra-violet rays will not traverse many bodies that are perfectly pervious to luminous rays, *e. g.*, glass. (3) The x -rays will readily traverse the superficial tissues and influence the nutrition of the deeper ones; the ultra-violet rays will not influence the deeper tissues, nor even the superficial ones, unless they are deprived of their usual blood-content, that is, dehematized. (4) The x -rays will traverse a thick book; the ultra-violet rays will be stopped by a single leaf of the same book. (5) x -Rays have no appreciable effect on the vitality of bacteria, whereas the ultra-violet rays will rapidly destroy the vitality of bacteria. (6) The x -rays will discharge an electroscope either positively or negatively electrified; ultra-violet rays will discharge an electroscope if electrified negatively, but not positively. (7) x -Rays will excite bright green fluorescence in willemite, and induce *white* phosphorescence in polysulfid of calcium; ultra-violet rays will excite bright green fluorescence in willemite, and induce *blue* phosphorescence in polysulfid of calcium. (8) Rock salt is *opaque* to x -rays, but is *transparent* to ultra-violet rays. The differences here pointed out go to show that we are dealing with agents of totally dissimilar nature, although in certain forms of disease they may both be used to effect the same end. The author points out that the terms "phototherapy" and "light treatment," when applied to the Finsen methods, are, strictly speaking, inaccurate, insomuch as the efficient agent is the nonluminous ultra-violet radiations; but there is a perfectly proper use of these names when they are used in connection with the luminous and colored rays. [The article under review and abstract is highly interesting, both from a scientific and practical point of view, and will amply repay reading in its entirety. Valuable references accompany the paper.]

The Technic of X-ray Therapy as Applied to Diseases of the Skin.—Louis E. Schmidt¹ (Chicago) goes into this important matter in a straightforward, practical manner that renders the article interesting to the worker with this apparatus. The author thinks that all patients should undergo a few trial sittings previous to any extended course of treatment, on account of a possible idiosyncrasy of the patient toward the rays, although he states that this is of rare occurrence. Kienböck and others deny its existence. As a standard for judging the strength of a tube, that is, for measuring the electric energy consumed by any tube, the following method, which can be used on all coil and static machines, may be mentioned. A separate shunt is introduced into the secondary, that is, parallel to the x -ray, tube by means of two sliding contact points. If the amount of electric energy is to be measured, the points are brought within such a distance of each other that the energy passes between the points of the shunt-spark gap. This will measure the length of the spark in centimeters which a tube will consume. As

¹ Jour. Am. Med. Assoc., Jan. 3, 1903.

to tubes, all are practically of two types, the regulated and nonregulated. It is generally upheld that soft tubes give quicker and more effective results than hard tubes, although Schiff recommends the latter for therapeutic uses. A large quantity of fluorescence does not necessarily mean a large quantity of *x*-rays. It usually means a low vacuum or signifies a fresh tube. Too soft a tube may not produce sufficient *x*-rays for the treatment of skin diseases. Tubes having a median vacuum are desirable. In a quite low vacuum the electric energy is converted into heat rays. The fluorescence of tubes changes by long use, and especially by the use of excessively strong currents. It is the aim to run a tube at its highest efficiency; that is, to produce the greatest quantity of *x*-rays from the least current that passes through the tube. An anode that becomes red-hot shows that the current is in part converted into heat and not all into *x*-rays. In these cases more electricity is being passed through the tube than the vacuum of the tube can convert into *x*-rays. For example, if a high-vacuum tube and a 15-inch spark be passed through, a terrific amount of *x*-rays is generated. The same spark in a low-vacuum tube is converted into heat; then the anode disintegrates or even a puncture of anodal plate may occur, which may lower the vacuum still more. Finally, the dosage may be regulated by (1) increasing or decreasing the *x*-rays, (2) applying them in a more or less intense manner; the former depends on the tube used if the efficiency is measured, the latter by increasing or decreasing the distance at which the tube has its least efficiency for working purposes. [All these points are of great interest to beginners and others in the use of *x*-ray instruments, and the original article is worth reading.]

Radiotherapeutic Observations.—Joseph Zeissler¹ (Chicago) gives in a valuable paper his experience covering a wide field in the treatment of cutaneous diseases. Eighty-one cases were so treated, and the results were so favorable as to make the author an ardent advocate of its use. Three cases of keratosis palmaris were much benefited, and in one of them recovery seemed to set in after 5 strong exposures. In one case of lichen planus hypertrophicus the lesion disappeared in an almost marvelous way after 4 exposures, given at intervals of 5 days each, and left the skin in a perfectly normal condition. The author speaks well of the treatment in hypertrichosis of the face, and is perhaps more sanguine in his views than most dermatologists. He does not allude to the recurrence of the abnormal growth. He refers to one case in which all the hair of the invaded area fell out after the third exposure. This is an unusually rapid result. The author is careful to protect the normal skin with thick sheet-lead, which he lines with flannel. He cautions operators not to be careless in exposing the lips unnecessarily, for they are very susceptible to irritation by the rays. The eyes and the hair should also be protected.

The Therapeutic Use of the X-ray.—D. C. Brockman² finds from his observations and inquiries that the physicians who are without faith in the *x*-rays as a curative agent are generally those who have had but

¹ Jour. Am. Med. Assoc., Feb. 21, 1903.

² Railway Surgeon, March, 1903.

little experience with it, and that in an unsatisfactory way, either for lack of proper instruments, time, or patience. They are usually "operating surgeons" who have faith in little except excision for malignant diseases. In the case of superficial carcinomas there is no question but that brilliant results are obtained in very many instances; pain is controlled, ulcers heal, tumors disappear, and to all appearances the disease is cured. The author made inquiry in a dozen or more of the large hospitals in Chicago, New York, and Canada as to the character of the cases they were treating with the *x*-rays and the results, and he was surprised to find the greatest diversity of opinion concerning the scope of usefulness of this agent. From the reports made to him by physicians in reply to inquiries, out of 44 cases of sarcoma, 10 were apparently cured, 1 improved, and 17 not improved, but of these latter most were given only a few treatments, and some were nearly dead when they first came under observation. All the cases treated were inoperable. Of cancers, 80 cases were reported, 52 being superficial. Of these, 32 were healed or apparently cured; 5 were improved; 12 not improved. Almost every case of lupus on which it was given properly was reported cured. Encouraging reports were given in acne, sycosis, and chronic localized eczema, and this class of diseases do best under a soft tube at a distance of about 12 inches, with 10- to 12-minute sittings daily. Sarcoma and carcinoma require a harder tube, sufficient to give but a shadowy picture of bones of hands, with an exposure of 12 to 20 minutes, at a distance of 4 to 6 inches, exposure to be repeated daily until a well-marked inflammation is set up.

Novelties in the Physical Treatment of Skin Diseases.—L. Freund,¹ of Vienna (well known for his excellent work in radiotherapy), gives some interesting information on the use of *x*-rays in connection with several new instruments—the spintometer and the radiochromometer. The spintometer, arranged parallel to the Röntgen tube, measures the length of the sparks. The length of a parallel spark, or the equivalent spark in air, furnishes a relative means of measuring the resistance, for it is known that electric resistance of the tube depends on the vacuum, and the penetrability of the *x*-rays corresponds to the vacuum. With "hard" tubes the equivalent spark is long; with "soft" tubes, it is short. Freund has made some experiments the result of which shows that the conception of an equivalent spark for characterizing the grade of "hardness" of a tube has but a relative value; that is, only when the corresponding data always refer to one and the same inductor. The radiochromometer fails to consider exactly all the physical conditions, because its effect depends not only on the thickness, but also on the density (atomic weight), of the material to be penetrated, on account of the penetrability of the rays. The question arises whether a rational Röntgen treatment rests only upon the accurate estimation of the intensity and quality of the rays. The circumstances resemble those of digitalis medication—the dose must be adapted to the patient. So with the application of the Röntgen rays, the reaction must always be con-

¹ Phila. Med. Jour., May 9, 1903.

sidered; individualization is everything. Good and bad results follow without exact mathematic estimation of the quantity of the rays needed for obtaining an effect, if the approximate value of the intensity of the fluorescence of the tubes is understood. Instruments, therefore, of the kind considered are not able to take the place of experience with practical work.

On the Practical Results of Actinotherapy.—William S. Gottheil¹ (New York) reviews the work in varied diseases of the skin by observers in all parts of the world, and considers the several diseases in which it has been found useful or otherwise. It is curious to note that in eczema of the face Hellmer, Minin, and Gerson obtained good results, whereas Finsen's 5 cases of eczema of the face are all reported as negative. Gottheil states that he has found it a powerful aid to treatment of sluggish syphilitic ulcers, but unsuited to the more actively inflamed varieties of the disease.

A New Form of Finsen Lamp.—G. G. Stopford Taylor² (Liverpool) describes and depicts a new lamp, designed to meet the demand for a very small lamp, automatic in its action, burning iron or carbon electrodes, and working direct from the electric supply main. The shell of the lamp is a water-jacket of very small proportions, mounted on a frame which permits motion in all directions and at the same time is rigid when in working position. From 15 to 20 minutes are sufficient to produce a good reaction. It is noiseless. On the score of economy this lamp is a distinct advance on all modifications of Finsen's apparatus. The current is 2 amperes at a pressure of 40 volts across the arc. A photograph shows the lamp in working position under the chin, one of the most difficult positions to reach. The lamp is made by John Hunter & Co., of Liverpool.

Screen for Protection from X-rays.—P. G. Unna³ (Hamburg) recommends a zinc gelatin paste containing 10 % of cinnabar and bismuth oxychlorid. The hands of the operator are covered with a double layer of this paste with an external layer of wadding.

The Therapeutic Use of Suprarenal Gland in Certain Diseases of the Skin.—Martin F. Engmann and Wm. P. Loth⁴ (St. Louis), after referring to the work done by various observers, state that the dried extract has been the only preparation used by them and always in the form of a powder. The dose has always been gradually increased. In children under 4 years $\frac{1}{2}$ grain 3 times daily can be given with safety and gradually increased to 2 grains. Between the ages of 4 and 12 years, 1 grain is the initial dose, gradually increased to 3 grains thrice daily. In adults 2 grains gradually increased to 6 may be used. The drug should never be taken on an empty stomach, as violent purging, griping, nausea, and vomiting can be caused, probably by its local effect upon the gastrointestinal mucous membrane. Some say that the drug is perfectly harmless, but such is not the case. It produces a cumulative action on the nervous system which disappears on stopping the use of

¹ Phila. Med. Jour., Jan. 10, 1903.

³ N. Y. Med. Jour., May 2, 1903.

² Lancet, Feb. 21, 1903.

⁴ Med. News, May 30, 1903.

the remedy. The authors found it useful in general pruritus, chronic urticaria, lichen urticatus, and in 2 cases of morphea. The action of the drug is upon the muscle-coats of the vessels and probably upon the vasomotor centers.

On Glycerolates.—Karl Herxheimer¹ (Frankfort) goes into the subject of the treatment of certain diseases of the skin with glycerin, and especially of its value in the form of ointments and glycerolates. The following formula is recommended, a similar one having been in use by the author for many years: Tragacanth, 4 parts; acetone, 30 parts; glycerin, 46 parts; water, 18 parts; aromatic perfume, 4 parts. This is designated as an "aromatic glycerolate," and is transparent, clear, firmer than glycerin ointment, of a sticky almost elastic consistence, and can be satisfactorily rubbed into the skin, and has in particular the advantage of serving as a covering to the skin. Incorporated with it, many useful remedies may be applied to the skin, as, for example, zinc oxid, tar, pyrogallol. Thus, 10 % zinc oxid is of particular value in the moist and fissured eczemas of children, who might object to the rubbing in of ointments or the application of plasters and bandages. In such cases it serves, moreover, as an invaluable protective agent. In pruritus, menthol, naphthol, tumenol, and balsam of Peru (5 % to 10 %) glycerolates are useful. In psoriasis pyrogallol applied in this way often agrees with the skin, whereas in ointment or spirit form it would prove irritating. The same remark applies to lupus. Resorcin, sulfur, ammoniated mercury, ichthyol, and many other drugs may also all be applied with advantage by this method.

SYPHILIS.

Prevention of Syphilis and Venereal Diseases.—A. Neisser² (Breslau) (on the occasion of the Second International Conference for the Prevention of Syphilis and Venereal Disease) contends that "The State has the right, from the standpoint of hygiene, to combat, by legal measures, the dangers caused by prostitution; and that the systems at present in use, which are chiefly of a police character, should be transformed into sanitary systems which should not be obligatory, except as they are absolutely necessary to hygienic ends. The State should not only adopt measures for the restriction of prostitution, but should take advantage of the many opportunities which are offered for contending against the spread of venereal diseases, as, for example, by familiarizing the public with the dangers and importance of these diseases; above all, that young men should be instructed that not only is chastity and continence not detrimental, but that these attributes are desirable from the medical point of view. The principles of the laws for preventing venereal diseases and contending with the melancholy consequences of prostitution should be relegated to the parochial or municipal authorities of each district. The law should guarantee to every one suffering from venereal disease gratuitous hospital treatment, of which the State should assume the expense, and for which it should erect hospitals in every important

¹ Berl. klin. Woch., Nov. 24, 1902.

² Amer. Med., Sept. 27, 1902.

town or community. Prostitution itself should not be considered a misdemeanor, but it should be punished when the State or society are injured through the offender. [Sooner or later the problem of contending with syphilis from a hygienic and sanitary standpoint must be met in all countries. Our knowledge of the disease to-day and its baneful effects not only upon individuals, but also upon communities, not to mention armies and navies, entitle it to much more consideration than has hitherto been accorded it. The observations and suggestions of Neisser and others on the occasion of the recent congress convened for its discussion are worthy of serious attention.]

Methods Preventing the Spread of Syphilis.—M. I. Pokrovskaya,¹ on investigating the subject of sexual and nonsexual syphilitic infection, found on examining statistics that in Russia nonsexual infection was commoner in villages, while the reverse was the case in cities. Whole families of peasants eat with the same wooden spoon out of a common bowl and sleep on the same bed. The author believes that nonsexual infection is more frequent in cities than is generally supposed, and that many cases in which the chancre is never seen are attributed to sexual contact, while in reality they are acquired in the family, from friends, or from eating utensils in restaurants, and from surgical instruments. The author thinks that women are often wrongly accused of transmitting the disease, for the periods of incubation of chancre are so variable that it is impossible for a man to say in the majority of cases that a certain woman infected him. As to the frequency of infection from different classes of prostitutes, Fedoroff found that 25 % came from licensed houses; 22 % from public women living alone; and 61 % from women not registered as prostitutes. Fournier has estimated that from 15 % to 23 % of the population of Paris are syphilitic. Statistics seem to show that in Norway, Holland, and Denmark syphilis is not only endemic, but that it increases and diminishes in waves, or at times in epidemics.

What Can be Done to Prevent the Spread of Syphilis?—E. H. Griffin² (New York), in connection with many years' experience among the poor in throat and nose dispensary work, has encountered many instances of syphilis derived from accidental causes, some of which are enumerated and described, all of which go to show that the contagion of syphilis exists in secondary as well as in primary lesions, and that innocent persons, children as well as adults, often become infected through a multitude of ways, most of which are not suspected by the public. A list is presented, illustrated by examples in the author's experience. Suggestions are made for the abolition of fruitful sources of contagion in public places. [Articles of this kind are of value, and it would be for the welfare of mankind if the paper under consideration could be widely circulated among the public of all countries. The knowledge therein contained would serve to guard persons from possibly contracting a disease that lurks in little suspected avenues and localities.]

The Anatomopathologic Characteristic of Syphilis.—J. Renault³

¹ Raussky Vratch, March 29, 1903.

² Med. Rec., Dec. 27, 1902.

³ Phila. Med. Jour., Jan. 17, 1903.

(Lyons, France) discusses in an able manner this question, referring first to the gumma, long considered the typical tumor of syphilis, and states that while such pathologic processes as carcinoma and sarcoma, in whatever tissue they may occur, always show unequivocal characteristics, the gumma varies in structure, depending on the tissue in which it occurs; thus, in the liver or brain it is one form, while in the skin it is a different formation. From a large number of cases examined the author concludes that the gumma has no anatomic peculiarity, being even less constant in structure than tubercular granulations. He even states that there is no typical neoplasm characteristic of syphilis. Each tissue makes its gumma as it can, because this is simply the reaction to the pathogenic agent, which, at a certain stage, causes slow obliterating endarteritis tending to produce tissue about the tendinous fibrous tissue in the skin, because the derma is an aponeurosis; neuralgia in the nervous centers, because that is the supporting tissue there, and lymphoid marginal tissue in the liver, because that is the effect of the reaction of hepatic tissue to slow ischemia. In the syphilitic process first a multitude of arterioles are affected, as seen in the macular erythematous syphilitoderm. Its action later becomes localized to territories corresponding to the important arterial branches, and the lesions then become more circumscribed and have more serious consequences. By this endarteritis syphilis causes in the tissue a process of sclerosis, which persists as long as the endarteritis lasts, for that is the natural and fatal result of subacute obliterating endarteritis, and this, generally considered, is the histopathologic characteristic of syphilis.

The Transmission of Syphilis.—Matzenhauer¹ enters into the question whether the syphilitic father can beget a syphilitic child when the mother is healthy, which he answers in the negative, and for the following reasons: It is generally conceded that no infectious disease can be transmitted by the semen. The semen of a syphilitic is not infectious. It is well known that there are more syphilitic fathers than there are syphilitic children. Men who have recent syphilis have sound children if the mother remains healthy. Women who seem to be free of syphilis, but who bore syphilitic children by their first husband, continue to bear syphilitic children even though their second husband be free of syphilis. Many women are syphilitic who show no signs of syphilis. In from 30 % to 40 % of tertiary syphilitic cases no earlier symptoms can be proved. The mother of a syphilitic child is always immune (Colles' law). Every mother of a syphilitic child must be syphilitic, even though the disease be latent, from which it follows that the theory of the paternal transmission of syphilis is unnecessary. From this it may be deduced that the treatment of the father does not influence the future child's fate.

Hereditary Early Syphilis without Eruptions.—Carl Hochsinger² points out that while the diagnosis of acquired syphilis may usually be made or confirmed by cutaneous lesions, such is not the case with congenital syphilis. He cites 14 cases of hereditary syphilitic children

¹ Wien, klin. Rundschau, Nos. 8, 9, 1903.

² Arch. f. Derm. u. Syph., May, 1903.

in which there was no disease of the skin at birth or later, but which in their first year showed osseous and visceral diseases. The nose was affected with a more or less marked inflammation in all the cases. The spleen was enlarged and readily palpable in 6 of the cases; in 8 there existed osteochondritis with pseudoparalysis of one or both arms.

Parasyphilis.—George Ogilvie¹ (London) takes up this subject from the standpoint of Edmund Fournier's book, following and limiting himself to his line of argument. A parasyphilitic affection is defined as one syphilitic in origin but not in nature. Its two characteristic features are the following: (1) Parasyphilitic affections are to be met with independently of syphilis; they may be due to other causes as well; they are "*banal*" (nonspecific, or as contrary to specific), while syphilitic lesions, properly so called, such as mucous patches and gummas, are never produced outside the domain of syphilis. (2) The so-called specific drugs have a totally different influence upon parasyphilitic affections from that which they are known to exercise upon true syphilitic lesions. "There is really an abyss between the one and the other." These drugs are said to have either no effect at all upon parasyphilis or the effect is slow and incomplete, while in the case of syphilis it is rapid and efficient. According to Ogilvie, the inconsistency of the theoretic foundation of the whole doctrine is best illustrated by the practical conclusions drawn from it. The theory is bound to lead to direct opposition with facts, because the premises upon which it is based are fallacious, and because it is reared on a wrong notion of specificity. The idea underlying the doctrine of parasyphilis is not new. Any specific disease may, and often does, lead to sequels void of all specificity. Under different names, such as quarternary syphilis, pseudosyphilis, postsyphilis, etc., exactly the same idea has at different times made its appearance in the history of syphilography; and what is particularly new in the modern teaching of parasyphilis is the great extension given to the baneful and deteriorating influence of syphilis on the race.

Coexistence of Syphilitic and Parasyphilitic Changes.—Mouratoff² discusses the question of the relation of syphilitic nervous changes to those of general paralysis, and quotes cases to support his view that changes of both sorts may coexist side by side in the cerebrospinal axis. A case is given which goes to show that the syphilitic poison was the probable cause of both sets of changes.

A Study of the Syphilis Bacillus.—M. Joseph and Piorkowski,³ having failed to find any specific bacillus or microorganism in the blood or in lesions of syphilitic subjects, examined the semen from the same (22 in number), and found a bacillus resembling the diphtheria bacillus. This was never found in the semen of healthy individuals, nor was it found in late syphilis. The presence of this organism in chancres and in secondary lesions is now being investigated by the authors.

Researches upon Blood in Ulcerous and Gummous Syphilis as

¹ Lancet, June 13, 1903.

² Brit. Med. Jour., Dec. 20, 1902.

³ Berl. klin. Woch., March 24, 1902.

to Iron.—S. Loewenbach and M. Oppenheim¹ enter upon this subject exhaustively and with numerous experiments, in Neumann's clinic in Vienna, from which studies the following conclusions are drawn. In late syphilis, as well as in precocious malignant syphilis, hemoglobin and iron show a considerable decrease from the normal. Neither are influenced by the usual treatment for this disease. The number of red and white corpuscles are within the normal count.

Justus Test for Syphilis.—H. Tucker and W. E. Huger, Jr.,² conclude from their experiments that this test for syphilis, which is based upon the theory that in this disease there is an impairment of the vitality of the blood-corpuscles, is unreliable, as the reaction occurs with an almost equal degree of frequency in the nonsyphilitic diseases with which syphilis may be confounded.

Recent Researches upon the Blood in Syphilis.—Ph. Pagniez³ reviews the many articles contributed to the literature of this subject written during the past 3 years, and concludes that while leukocytosis may exist, it is inconstant, and that it is nearly always of a mild form. It may be recognized by an increase of the polynuclears and mononuclears, but the latter are rarer, so that it is not possible to speak of syphilis as a mononuclear disease, at least beyond the period of the chancre, from which facts it is not possible to obtain any new idea truly of use to the practitioner, nor even any idea of distinct pathogenic significance. Syphilis is essentially a polymorphic disease, and is without constant reactions, thus differing from the acute cyclical diseases, such as pneumonia, variola, with a clearly defined blood-formula. The blood in syphilis does not remain indifferent, but reacts with a constant tendency toward hypochromia, toward hypoglobulia, and sometimes toward leukocytosis. In the light of observations it would be an exaggeration to go so far as to classify syphilis as one of the anemic diseases, in which latter anemia is the rule, or among the diseases of the type of leukocytosis precisely determined.

Syphilis the Cause of General Paralysis.—F. W. Mott's⁴ observations in connection with researches carried on in the pathologic laboratory of the London County Asylums go to show the very important part played by syphilis in the production of general paralysis. The view is also expressed that tabes dorsalis is etiologically identical with general paralysis, an opinion held by the leading authorities in England. The chief neurologists in England and Germany believe that syphilis is the chief factor in the causation of polymorphic disease.

Syphilis as a Cause of Death.—Byrom Bramwell⁵ estimates that 10 % of individuals having syphilis present tertiary lesions, and that life is shortened on an average of about 10 years in these cases, this estimate not including general paralysis and tabes. If these were added, the average diminution of the expectancy of life would be 15.8 years. He believes that 50 % of the cases of aneurysm of the aorta are due

¹ Deut. Arch. f. klin. Med., vol. lxxv, Nos. 1 and 2.

² Medicine, Aug., 1902.

⁴ Canad. Jour. of Med. and Surg., May, 1903.

³ Ann. de Derm. et de Syph., July, 1903.

⁵ Medicine, April, 1903.

to syphilis, and that it is impossible to say how many cases of valvular heart-disease, cirrhosis of the liver, kidney disorder, cerebral softening, apoplexy, hemiplegia, insanity, myelitis, paraplegia, atheroma, and myocarditis are the result of syphilis. Every one infected with the disease is to be regarded as damaged. In the first decade after the disease has been contracted each case should have an extra premium amounting to from 6 to 10 years added; in the second decade, 4 to 6 years, and for the remainder of life, say 2 years.

The Open-air Treatment of Syphilis.—E. H. Doughty¹ (Davos-platz, Switzerland) considers that this method of treatment is as important in syphilis as it is in tuberculosis. He regards the parallel as strict. To throw off the poison of syphilis much depends on the resisting power of the individual, and in this respect there is an analogy between syphilis and tuberculosis. The author has noted that 30 % of his tuberculous patients in the high Alpine altitude of Davosplatz are also syphilitic, most of them men who have led hard-working business lives; that climate with mercury gently given certainly does them good, and very little mercury under this condition goes a long way. He thinks that every syphilitic should devote one or if possible two years to outdoor life. Early syphilitics in particular do remarkably well in high altitudes.

Notes on the Treatment of Syphilis.—W. A. Hardaway² directs attention to the importance of individualization in the treatment, especially of tertiary lesions. The specific remedies often fail because the vitality is low, in which case the system should be given an opportunity to become renovated. He recommends for the latter class of cases a formula liked by the elder Bulkley, somewhat modified, as follows: potassium iodid, 5iv; citrate of iron and ammonium, 5j; tincture of nux vomica, 5ij; water, 5iss; compound tincture of cinchona, to make 5iv. Dose, 1 dram after meals. The mixture is not pleasant to take, but its therapeutic virtues counterbalance this objection. In addition, a pill of from $\frac{1}{2}$ to $\frac{1}{2}$ grain of protoiodid of mercury and $\frac{1}{2}$ grain of opium is to be taken before breakfast and at bedtime.

Mercury in Syphilis Used Hypodermatically.—Eugene Fuller,³ after contrasting the benefits of this drug used by the mouth and in other ways with the hypodermatic method, states that as a result of much personal experience he has adopted the salicylate of mercury as the best for hypodermatic medication. The ordinary full dose of the insoluble salt so injected is $1\frac{1}{2}$ grains. This amount can be given in 20 minimis of oil, liquid vaselin, albolene, and benzoinol being the best, and better than the vegetable oils (as olive oil). The syringe should be one of 5j capacity, with a needle of about $1\frac{1}{4}$ inches in length and of the bore and thickness of a small-sized aspirating needle. Syringes made wholly of glass, with the exception of asbestos packing to the piston, are to be preferred. The oily mixture should be about the temperature of the body when injected. Antiseptic measures being observed, the injections are made into the buttock, the patient stand-

¹ Boston M. and S. Jour., Jan. 23, 1903. ²Amer. Med., July 26, 1902.

³Jour. Am. Med. Assoc., March 7, 1903.

ing erect. The mixture being thoroughly shaken, the syringe is filled quickly, but the injection itself is made gradually, a minute being taken for the dose. The injection is made every 5 to 7 days. It is not unusual after the first injection for a brisk diarrhea to develop in an hour or two and last the better part of the day, the result of prompt systemic effects. Salivation is to be watched for and avoided, although the author expresses the view that far more harm follows the administration in syphilis of too little than too much mercury.

Treatment of Syphilis with Intravenous Injections of Mercury

Cyanid.—Renault¹ speaks of the good results obtained from a 1 % solution, giving 1 cc. daily or every other day, into the veins of the arm. The injections are painless, and the action is rapid and sure, especially in diseases of the nervous system. The author treated 14 cases of syphilis, 3 of which had secondary symptoms with severe headaches; 3 had gummas of the tongue and gums; 2 had medullary disease; 4 had severe tertiary headaches, and 1 had epilepsy. In all of these the improvement was rapid, the headaches as a rule disappearing after the first injection. [It should be remembered that even weak solutions of mercuric chlorid employed by injection are capable, according to some authors, of producing phlebitis and thrombosis.]

Bonzitat² also advocates the same drug and treatment, used in the same strength and manner, 1 cc. of the solution (1 %) being injected every other day, or, in severe cases, daily. If there is salivation or diarrhea, the injections must be stopped. The chief contraindication to the method is in cases where the veins are sufficiently prominent, as in fat persons and in some women. The danger to thrombosis or embolism is regarded by the author as theoretic.

Intravenous Injections of Mercuric Chlorid and Other Salts.

—Nicola Cerri³ considers the Baccelli method of intravenous injections of corrosive sublimate in apparently hopeless cases of syphilis, stating that in his opinion it may be considered one of the triumphs of modern therapy. Baccelli has used this method also in aphtha epizootica in 141 bovines in the Grand Duchy of Hesse, without signs of mercurialism; and of 117 cases treated in Bavaria only 3 showed any such symptoms.

Injection Treatment of Syphilis by Means of a New Mercurial

Formula.—M. L. Heidingsfeld⁴ (Cincinnati), after stating that the mercuric chlorid proves too painful to be well tolerated, often inducing abscess-formation and severe induration, and can be administered only in such small doses as to require almost daily visits, refers to pain, abscess-formation, and induration militating against calomel and salicylate injections, and graver complications against intravenous injections. A preparation which meets the requirements more successfully, the author believes, than any other, is the oleum cinereum, or gray-oil, after the formula of Lang, as follows: Rx. Lanolin, 3; chloroform, enough to make a solution; mercury, 6; mixed and rubbed down perfectly; vaselin oil, 3. This formula, with the following modifications, has given satis-

¹ Phila. Med. Jour., March 14, 1903.

² Thèse de Paris, July, 1902.

³ Med. Rec., Aug. 30, 1902.

⁴ Jour. Am. Med. Assoc., Sept. 13, 1902.

factory results. The modified form is prepared by using bidistilled mercury, the same that dentists use in preparing amalgams. Six grams of bidistilled mercury can be readily incorporated in the course of a few minutes with 2 grams of lanolin when rubbed together in a clean mortar, which dispenses with the use of chloroform, which is a decided irritant. The following is the author's formula: lanolin, 2; bidistilled mercury, 6, well rubbed together; liquid alboleone, 2; 1 grain (0.06) to be injected every 3 or 4 days. This preparation can be readily drawn into a hypodermatic syringe. The injections should be made into the buttocks, the author recommending a $\frac{7}{8}$ -inch 22-gage steel needle, which insures the injection being deposited deeply into the layer of the subcutaneous fat. Pain over the site of the injection is seldom noted, and if present usually develops during the second day. Abscesses are very rare. Lang's preparation he found somewhat irritating and difficult to preserve. A word of caution should be given. It is best to begin the treatment with a minimum dose ($\frac{1}{4}$ to $\frac{1}{2}$ grain for each injection) and gradually increase to 1 grain or more, in accordance with the degree of tolerance manifested by the patient. The syringe should have a retaining screw, and should be properly set to guard against excessive dose. The gluteal region should be utilized, and the calf of the leg avoided.

Mercury Salicylate in Syphilis.—A. Lezius¹ speaks well of this drug employed subcutaneously, and in the form of 1 gram to 10 grams of liquid vaselin, one Pravaz syringeful (equal to 0.1 gr. of the salt) being injected once a week. He treated 25 cases, of which some had not before received any drugs, while the rest had received preparations of mercury. The results were satisfactory, the erythematous syphilitic derm disappearing after 2 or 3 injections; patches in the throat after 3 injections; condylomas after 4 or 5 injections. He prefers this salt to all the other insoluble salts of mercury. It produces a minimum of local reaction and but little danger of intoxication.

Intramuscular Injections in Syphilis.—Lévy-Bing² has written a book of 300 pages on this subject, wherein he gives his personal observations in 500 patients in the St. Lazare Hospital. He considers this mode of treatment suitable for all stages of the disease and for all ages, and especially for debilitated individuals. The duration of the treatment consists of 4 courses the first year, 3 each the second and third years, and 2 in the fourth year. Stress is laid on the amount of mercury in the preparation employed, and it is pointed out that mercury exists in the body as metallic mercury and not as a chlorid, as was formerly thought to be the case. The preparation selected should be but little toxic, and cause no pain, abscess, or induration, to which no cocaine or morphin should be added. Among the soluble salts the best results were obtained with the biniodid, the benzoate, the lactate, and the neutral salicylate; these are employed in a series of 20 or 30, and are made daily. Mercury having a cumulative action, such conditions as diarrhea or stomatitis are more readily controlled than these conditions

¹ Jour. de Méd. de Paris, May 3, 1903.

² "Intramuscular Injections in Syphilis," Paris, 1903.

resulting from the use of the insoluble preparations, which are usually given about once a week. Of the insoluble salts, calomel is the best, but the fact that it gives rise to much pain is a reason for its being reserved for grave cases. The gray oil and the basic salicylate are the most satisfactory preparations for general use. In order to avoid the wounding of bloodvessels, the injections with the insoluble preparations should be made in two stages.

Treatment of Syphilis by Intramuscular Injections of Hermophenyl.—Nicolle¹ reports excellent results from this drug, which is sodium mercuro-phenol-disulfonate. He injects 2 cc. (30 minims) of the following solution: hermophenyl, 0.1 gram ($1\frac{1}{2}$ grains); distilled water, 9 cc. ($2\frac{1}{2}$ drams). This should be sterilized in an autoclave. It was employed by the author in 94 cases, who had only very slight accidents from its use. It did not cause persistent induration of the parts, abscesses, scars, or signs of mercurial poisoning.

Hallopeau² reports 20 cases treated by the same drug. He concludes that so far as the secondary symptoms are concerned its action is equal to that of mercurial preparations in general use, if sufficiently large dosage be employed. Its advantages are that relatively large doses may be injected into the muscles without causing pain and local inflammation; that it may be given by the mouth without giving rise to digestive disturbances; that it can be locally applied in strong solution without producing pain or inflammation; and that it does not form an amalgam with gold, thus being without effect on gold in teeth. The dose by the mouth was 6 egm. (equal to 16 mgr. of mercury) daily; injected intramuscularly the dose was 4 egm. (16 mgr. of mercury) dissolved in 2 egm. of distilled water. The strength for local applications was 1 : 100 or 1 : 50. It is a valuable antiseptic.

Intramuscular Injections of Mercury Acetamid in Syphilis.—T. Barthelemy, Lafay, and Lévy-Bing³ conclude from a series of 521 injections of this drug that in the required dose of from 2 to 3 centigrams daily diarrhea and stomatitis are easily provoked, and that indurations are often caused; and that the injections are painful on the average for 2 hours afterward; that the therapeutic results are insufficient, and are inferior to the aqueous solution of the biniodid of mercury.

Massive Doses of Mercury Employed Hypodermatically in Syphilis.—Leredde⁴ (Paris) gives an article on the use of the different salts of mercury in syphilis, and believes that the efficiency of a mercurial salt depends on the proportion of mercury it contains. Mercuric cyanid contains 79 % of mercury; mercuric chlorid, 73 %; biniodid, 44 %; benzoate, 45 %; and calomel over 84 %. He is in favor of larger doses than those generally employed, as, for example, 3 centigrams of the mercuric cyanid daily instead of the usual dose of 1 centigram (or about 0.46 of a grain instead of 0.15 of a grain), particularly in syphilis of the nervous structures. The author uses calomel in doses of 10 centigrams

¹ Amer. Med., Jan. 21, 1903.

² Bull. de l'Acad. de Méd., July 29, 1902.

³ Ann. de Derm. et de Syph., July, 1903, p. 601.

⁴ Le Bull. méd. de Québec, Oct., 1902.

(about $1\frac{1}{2}$ grains), the second injection being administered about 16 days after the first; the third, 6 days after the second; and the fourth, 5 days after the third. Calomel is rapidly absorbed, as proved by the severe local and general symptoms. The value of intravenous injection is not yet satisfactorily established. He thinks that some of the so-called parasyphilitic diseases have been regarded as incurable for the reason that they have been inefficiently treated.

G. Maurange¹ also expresses himself strongly in favor of the hypodermatic method over the employment of pills and frictions. He prefers a syringe made entirely of glass with an iridoplatinum needle, and he indorses Leredde's conclusions.

Injection of Mercury Biniodid in Aqueous Solution in Syphilis.—E. Emery and M. Druelle² consider that this drug occupies an important place among the soluble salts of mercury, particularly when rapid healing of persistent lesions is demanded and in cases in which a prolonged course of mercury is not required. It has the advantage over other soluble injections of being tolerated in large doses, and is more readily employed than the benzoate or the cyanid, the two soluble salts in most common use. Aqueous solutions are to be preferred over oily solutions, as formerly recommended by Panas, Dieulafoy, and others. Cases are given in which it acted efficaciously.

Iodin Compounds Administered Hypodermatically in Syphilis.—Lang³ states that when potassium iodid is not well borne by the stomach it may be given with advantage hypodermatically, as in the following formula: potassium iodid, 75 grains; codein hydrochlorate, from $\frac{3}{4}$ to $1\frac{1}{2}$ grains; distilled water, $1\frac{1}{2}$ drams. From 16 to 48 minims of this solution may be used for each injection. Or the following may be used instead of the above: iodoform, 75 grains; liquid petrolatum, $1\frac{2}{3}$ drams. From 8 to 16 minims are injected daily or every two days. Iodoform gives excellent results in certain syphilitic infiltrations, especially ganglionic enlargements, which disappear rapidly when injections are made near them.

Mercuric Chlorid Lotion in Syphilis.—Treves⁴ speaks well of the following wash in the general treatment of syphilis: mercuric chlorid, 15 grains; aleohol, $3\frac{1}{2}$ ounces; water, $\frac{1}{2}$ ounce. The water is used because it has been proved that hydrated solutions are more readily absorbed than those of absolute alcohol. The individual is bathed with this wash every two days, avoiding the mucous surfaces and the deep normal furrows on the surface of the integument.

Yaws and Syphilis.—Steuber⁵ (*Dar-is-Salâm*) is of the opinion that these diseases are distinct. The negroes in German East Africa designate yaws *buba*, and syphilis *Kassuende*, buba being equivalent for pustule. The lesions of yaws do not always have the characteristic frambesial aspect, the differential diagnosis between it and syphilis being at times difficult. Like other observers, Steuber has found potas-

¹ Gaz. Hebd. de Méd. et de Chir., July 6, 1902.

² La Presse Méd., Feb. 11, 1903.

⁴ Nouveaux Remèdes, Oct. 24, 1902.

³ N. Y. Med. Jour., Aug. 31, 1902.

⁵ Brit. Med. Jour., Sept. 20, 1902.

sium iodid very effectual in yaws, but this does not prove its syphilitic nature, any more than the good results from mercury in lichen planus prove that disease to be syphilitic. Robert Koch observed yaws in course of the German malaria expedition to New Guinea, and differentiated it from syphilis. He did not meet with a single case of syphilis in the aboriginal villages, but that disease was observed among the imported laborers. Daniels found plenty of yaws among the Fijians, but no syphilis. Jeanselme, in French Indo-China, found these diseases different, while Kynsey in Ceylon and Powell in Assam reached the same conclusion.

Four Cases of Syphilis Mistaken for Smallpox.—J. F. Schamberg¹ reports these cases, which presented themselves at the Philadelphia Municipal Hospital, pointing out the differential diagnosis, concluding with the advice that whenever the diagnosis between syphilis and smallpox is in doubt, observation of the progress of the eruption for a period of 24 or 36 hours will usually make clear the nature of the disease. [Such errors are not uncommon in all communities, and for this reason the subject is worthy of repeated reference, thus keeping the subject constantly before the profession.]

¹ Jour. Am. Med. Assoc., Nov. 29, 1902.

MATERIA MEDICA, EXPERIMENTAL THERAPEUTICS, AND PHARMACOLOGY

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[THE American Therapeutic Society at its Washington meeting last May fully maintained its reputation for thoroughly good work. An important feature was a symposium upon the "Teaching of Therapeutics," in which several successful teachers took part. The general conclusions were that the following methods should be combined in suitable time allotment: (1) A practical acquaintance with various remedial physical measures and remedies, not less physiologic, and methods of preparing the latter. This should be acquired during the early and mnemonic period of the student's career (recitation and demonstration). (2) Actual knowledge of the action of agencies and remedies acquired by personal experimentation and demonstration under the teacher's eye (laboratory demonstration). (3) Application of these agencies and remedies, the actuality of their effects for good or evil having been fixed in the student mind, in the treatment of diseases and symptoms, under proper supervision (lecture and clinical demonstration). (4) The accurate direction for the exhibition, in strict pharmacopeial nomenclature, of remedies and the scientific use of physical agencies must be so thoroughly comprehended by the student that he cannot only intelligently apply them, but give valid reason for his treatment (clinical practice and conference). The important features in the year's progress are, it is believed, faithfully presented in the following pages. We would call especial attention to the valuable work done on adrenalin and alcohol. Of the serums, antimorphin seems promising, antiplague more satisfactory, antistreptococcus of improved standing, and antityphoid on the way toward acceptance. We have now good scientific reason for the empirical value of male-fern, while the evidence is slowly accumulating as to the probability of some of the cacodylate preparations being inert. Ether and chloroform are still the subjects of observation and discussion without much nearer approach to a definite conclusion. The atmosphere of doubt as to the relative effects of the various constituents of ergot is now clearing. Ethyl bromid has been reawakened, and without the mortality which previously consigned it to temporary oblivion. The caution as to gelatin injections is timely. We now know much more about the pharmacology of the active principles of ipecacuanha and the latent effects of the various roots. In phototherapy, radio-activity, and

Röntgen-ray therapy we have made real progress during the past year. On the whole, progress in the practical portion of the healing art has been satisfactory, although not startling. The Committee of Revision of the United States Pharmacopœia are progressing toward the completion of an official work which will obtain the confidence and command the attention of physicians interested in *materia medica* and *therapeutics*.]

Acetanilid.—Stengel and White¹ report an instance of chronic acetanilid poisoning in a woman aged 25. The drug had been taken in large quantities for 5 years for the relief of insomnia and dental neuralgia. The chief symptoms were intense cyanosis and facial acne without dyspnea or coldness of the surface. The area of heart-dulness was increased and a systolic murmur was audible over the entire precordia. Examination of the blood revealed a marked reduction in the number of red cells and an increase in the number of leukocytes. Stained preparations showed a large number (over 32,000) of nucleated red cells per cubic millimeter. The cyanosis had been present for 5 years, different physicians having made different diagnoses. Upon withdrawal of the acetanilid the area of cardiac dulness diminished, the cyanosis disappeared, and the sounds of the heart became normal. [This should be taken as a warning against the indiscriminate use of drugs of this series and the real danger of permanent cardiac disability.]

Acetozone.—This is the commercial name of a mixture of benzoyl-acetyl peroxid and some inert absorbent material. It has been especially recommended as an internal antiseptic in typhoid fever, the patient being urged to drink during the day a quart of water containing from 10 to 20 grains of acetozone. F. G. Harris² reports 128 cases of typhoid fever treated with acetozone. The mortality was 8.59 %. The average stay in the hospital was about 28 days. The author concludes that when acetozone is given in large amounts and early in the disease, the temperature will return to normal in from 10 to 12 days. Woods and Thrush³ report 53 cases of typhoid fever treated in the Presbyterian Hospital, Philadelphia, in which acetozone was used. There were no deaths in this series. Billingslea⁴ also reports 25 cases of typhoid fever treated with acetozone without a death. [The above reports, as favorable as they appear to be, do not justify the belief that acetozone materially influences the general course of the disease. A lower mortality would be more conclusive.] J. F. Bennett⁵ reports 4 cases of chronic diarrhea in which he used acetozone with curative or markedly beneficial results. Klinedinst reports a case of infected corneal wound in which he applied acetozone (1 grain to 2 ounces of water) with marked success.

Adrenalin.—Taramasio⁶ concludes from experiments upon frogs, guineapigs, and rabbits that the direct cause of death in mammals poisoned by adrenalin is pulmonary edema, and that paralysis of the

¹ Univ. of Penna. Med. Bull., Feb., 1903.

² Therap. Gaz., March 15, 1903.

⁴ Atlanta Jour.-Rec. of Med., Feb., 1903.

³ Therap. Gaz., June 15, 1903.

⁵ Med. Age, vol. xxi, No. 3, 1903.

⁶ Rev. med. de la Suisse Romande, vol. xxii, 1902.

nervous system plays a minor part. In frogs, on the other hand, paralysis of the nervous system is thought to be the cause of death. P. P. Belaventz¹ finds that in dogs and rabbits the injection of large doses of adrenalin (1 milligram per kilo) into the aural vein causes extreme dyspnea, dilation of the pupils, convulsions, paresis, incontinence of urine and feces, and death. His conclusions are as follows: Adrenalin raises blood-pressure by stimulating the heart and constricting the vessels. The vascular spasm is due to a direct action on the vessel-walls. Adrenalin at first stimulates and then paralyzes the vagus center, without affecting the peripheral ends. In small doses adrenalin increases gaseous metabolism; *e.g.*, the amount of oxygen absorbed and the amount of CO thrown off are both increased. Large quantities markedly diminish gaseous metabolism. Adrenalin causes death by paralyzing the respiratory center. The nervous system is depressed by the drug. Caution is imperative in employing adrenalin intravenously or subcutaneously, a frequent pulse being a contraindication to further injections. Isaac Ott and S. B. Harris² have performed over 50 experiments in determining the physiologic action of Takamine's adrenalin. They agree with Oliver and Schaeffer, Gottlieb, Hedebom, and Cleghorn that adrenalin increases the force and rapidity of the heart-beat. They attribute this effect to the action of the drug on the heart-muscle and not to its action on the ganglions. They find that after a period of depression the respirations become more frequent and stronger, and that this action is not influenced by section of the vagi, thus proving that adrenalin stimulates the respiratory center and not the vagi endings. They agree with Pal and with Borutta and Langley that adrenalin given by the jugular vein arrests intestinal peristalsis. They are of the opinion that while nearly all the adrenalin is oxidized in the tissues, a small part is secreted by the kidneys when an excess is poured in the circulation. They agree with S. and C. Meltzer³ that the instillation of adrenalin into the conjunctival sac does not affect the pupil, unless the cervical sympathetic has been previously cut, in which case it causes mydriasis lasting some time. They agree with Reichert that injections of adrenalin elevate the temperature, and are inclined to believe that this effect is due to the action of the drug on the basal thermogenic centers. They find that 1 drop of adrenalin solution is more than sufficient to offset the local vasodilator effect of 10 drops of a 1% solution of nitroglycerin.

V. F. Simonovitch⁴ concludes from his studies that adrenalin is practically without effect unless injected into the blood, and that this want of action is due to the failure of absorption of the drug from the stomach. He believes that the remedy may be of service, owing to its direct action, in hematemesis, but that in heart-failure it should be injected intravenously only as a last resort, since the danger of causing cardiac paralysis by this procedure is considerable. E. Martin,⁵ in dis-

¹ Vratch, Feb. 15, 1903.

³ Amer. Med., Feb. 7, 1903.

² Therap. Gaz., June 15, 1903.

⁴ Vratch, June 14, 1903.

⁵ Therap. Gaz., May 15, 1903.

cussing the treatment of cardiac and respiratory failure during anesthesia, states that these conditions are best counteracted by hypodermic injections of cocaine, caffeine, and normal salt solution, employing in this latter 2 drams of adrenalin (1:1000) to the pint, and using a sufficient quantity to restore the vascular tonus. Absorption of the adrenalin should be hastened by vigorous massage, and when the emergency is great the drug should be given intravenously, preferably diluted 50 times by normal salt solution.

To test the efficacy of adrenalin as a hemostatic, D. Lehmann¹ excised a portion of the liver of a rabbit and then applied a solution of adrenalin to the raw surface. The hemorrhage did not cease, but the animal recovered perfectly after closure of the abdomen. When the solution was injected under the capsule of the liver, however, even large pieces of the organ could be removed without the least bleeding. Though the liver again filled with blood in a short time, no hemorrhage followed, owing to the formation of thrombi. A toxic action was never observed. Crile² concludes that shock is chiefly due to paralysis of the vasomotor center, and that collapse is excited by the same factor, although in the latter the exhaustion of the center is not so complete. Assuming this to be true, he believes that ordinary stimulants may be of service in collapse, but that they can do no good in shock because the center upon which they act is completely paralyzed; and, further, that adrenalin is of value in shock because it acts upon the heart and bloodvessels independently of the center, and thus may restore and maintain to some degree a normal arterial pressure, even when the vasomotor center is too depressed to irradiate impulses. M. S. Miles and W. Muhlberg³ draw the following conclusions from an experimental research upon adrenalin as a stimulant in vasomotor depression: (1) Adrenalin may be of value in so-called heart-failure during anesthesia, etc., when ordinary stimulants fail; (2) it is more likely to succeed where the respiratory centers are not paralyzed, since adrenalin does not appear to be a very powerful respiratory stimulant; (3) when used, it should be given subcutaneously, and slow massage done at the site of injection; (4) that dilution with normal saline solution, by making absorption slower, causes a more prolonged and less energetic rise in the blood-pressure; (5) bad after-effects were not observed, but the danger from secondary hemorrhage as a result of the high pressure must be borne in mind; (6) adrenalin, subcutaneously, is indicated on theoretic grounds for the vasomotor collapse following cocaine or chloroform poisoning, and possibly shock after operation.

O. Lange⁴ reports 6 cases, and L. Wheeler⁵ 2 cases of severe hemorrhage which were promptly controlled by adrenalin. Aronsohn⁶ was able to abort several attacks of asthma in the same patient by the local application of adrenalin (7½ grains to the ounce) to inflamed-looking

¹ Münch. med. Woch., Dec. 9, 1902.

² Boston M. and S. Jour., March 5, 1903.

³ Cleveland Med. Jour., Dec., 1902.

⁵ Brit. Med. Jour., April 11, 1903.

⁴ Münch. med. Woch., Jan. 13, 1903.

⁶ Deut. med. Woch., Jan. 15, 1903.

areas in the nose. M. Mahn¹ reports a case of hemorrhagic epithelioma on the tongue, which was much improved by the local application of adrenalin (1 : 1000). Termoyez² reports a similar success in epithelioma of the larynx.

Agurin.—This is a double salt of sodium acetate and theobromin containing 60 % of theobromin, as compared with 50 % in diuretin. It has been especially recommended as an unirritating diuretic. A. Nusch³ reports the clinical data of 4 patients, in all of whom the amount of urine was considerably increased by the administration of agurin. He finds that the best effects are seen in uncomplicated cardiac disease. Very good results were also obtained in pleurisy with effusion, while in parenchymatous nephritis the drug was without effect. The usual dose was 15 grains thrice daily. L. Ketly⁴ and M. Salacoln⁵ also report favorably upon agurin.

Alcohol.—A. Clopatt⁶ reports the results of a series of experiments upon himself, undertaken to determine the effect of alcohol upon metabolism. He confined himself to a special diet of exactly ascertained value for a period of 12 days. A part of the fat was replaced by an isodynamie amount of alcohol for a second period of 12 days, and this was followed by a third period of 7 days in which the alcohol was omitted, with no corresponding replacement of fat. As the result of the examination of the feces and urine during the entire period, he arrives at the following conclusions: Alcohol not only prevents the waste of nonnitrogenous food-stuff, but also of albumin after the body has become accustomed to it. Alcohol exerts no appreciable influence on the absorption of food-stuff by the intestine.

Binz⁷ concludes from his experiments that alcohol in moderate doses increases the respiratory capacity in most persons to a small degree. This increase is due to the direct action of the drug upon the nerve-centers, and is not reflex. Aromatic substances contained in wine increase the stimulant action of pure alcohol. Concerning the action of alcohol upon the circulation, he is unwilling to express a definite opinion. He found, however, that moderate quantities of the drug did not seem to exert any paralyzing action upon the heart itself or upon its inhibitory nerves. He thinks that alcohol is the best drug that can be used in collapse, and believes that many lives would be saved if it were more frequently employed. He is in accord with the preponderance of opinion that moderate doses of alcohol in healthy subjects conserve not only the carbonaceous elements of the body, but also the albumins.

R. F. Chase,⁸ finding that no consensus of opinion prevails regarding the influence of alcohol on digestion, has made tests on 3 healthy individuals not addicted to alcoholic liquors. Whisky and beer were the preparations chosen, 60 cc. of the former and 300 cc. of the latter being given during Ewald test-meals. The author concludes that salivary

¹ Ann. des Mal. de l'Oreille, du larynx, etc., May, 1903.

² Ibid.

³ Münch. med. Woch., Dec. 23, 1902.

⁴ Die Heilkunde, No. 8, 1902.

⁵ Thèse de Paris, No. 566, 1902.

⁶ Berl. klin. Woch., Sept. 29, 1902.

⁷ Berl. klin. Woch., Jan. 19 and 26, 1903.

⁸ Phila. Med. Jour., June 6, 1903.

digestion is slightly delayed by whisky and somewhat accelerated by beer; the influence, however, in either case being very slight. Peptic digestion, both in the stomach and in the test-tube, was noticeably delayed by whisky, and in a more marked degree by beer, in the latter case quite out of proportion to the amount of alcohol contained in the beer. Secretion was probably somewhat increased by whisky and may have been slightly stimulated by beer. Chase believes that his experiments indicate that liquor taken as a beverage with meals exercises, on the whole, a harmful influence.

Engels,¹ by tests with bacterial cultures, shows that the bactericidal effects of lysoform, bacillol, and sublamin are greater when these agents are used in alcoholic solutions than when they are used in watery solutions, but that the difference is not sufficiently great, however, to explain the marked advantage of alcoholic solutions in hand disinfection. He concludes that the advantages on the side of the alcoholic solutions must be largely ascribed to the solution of fatty matters by the alcohol, in consequence of which the disinfectant is brought into intimate relation with the skin structures. C. Harrington and H. Walker² draw the following conclusions from their own studies and the work of others upon the germicidal action of alcohol: (1) That against dry bacteria, absolute alcohol and ordinary commercial alcohol are both totally lacking in germicidal qualities. Preparations of alcohol of a strength of 70 % or less do have germicidal action. (2) Against the commoner nonsporing pathogenic bacteria, in a moist state, any dilution of alcohol above 40 % is effective. Dilutions of less than 40 % are too slow and uncertain in their action against either dry or moist bacilli. (3) The most effective dilutions of alcohol, for disinfecting purposes, are those containing from 60 % to 70 % by volume of alcohol. This is true both with regard to dry and moist organisms. Such solutions will usually kill any of the ordinary pathogenic germs in 5 minutes. (4) *Bacillus anthracis* is not affected by alcohol. [Thanks to the well-known accuracy of Harrington's observations, it is now well established that diluted alcohol (60 %) is more actively germicidal than pure alcohol.]

H. A. Hare,³ in a preliminary communication upon the effect of alcohol on the bacteriolytic power of the blood, concludes from experimental research that alcohol seemed to have the power of combating infectious diseases by increasing the bacteria-destroying power of the blood, and that while the experiments so far made are too few to be conclusive, they indicate that this effect is produced to some extent at least by an increase in complement.

Anesthesia.—This is the ethylic ether of paramidobenzoic acid. It is a white, odorless, tasteless powder, soluble in ether, alcohol, and oils, but insoluble in cold water. It is claimed for anesthesin that it is not poisonous even in larger doses than 30 grains. It resembles orthoform in its anesthetic properties, but, unlike the latter, it is not decomposed by contact with fats. G. Spiess⁴ uses anesthesin in all minor injuries,

¹ Centralbl. f. Bak., May 14, 1903. ² Boston M. and S. Jour., May 21, 1903.

³ Therap. Gaz., May 15, 1903.

⁴ Münch. med. Woch., Sept. 30, 1902.

and in painful affections of the skin and mucous membrane when the diseased nerve-endings can be reached by the agent. It cannot replace cocaine because, owing to its insolubility, it cannot be injected into the tissues. The author has also found anesthesin very useful in coryza and pertussis. Chevalier¹ considers anesthesin superior to orthoform because its action is more pronounced and of longer duration. A. Courtade² has found insufflation of anesthesin very serviceable in relieving the pain and dysphagia of tuberculous and syphilitic laryngitis. Henius³ has successfully employed anesthesin (10 % in an ointment made with equal parts of lanolin and vaselin) in 25 cases of erysipelas.

Antimorphin Serum.—L. Hirschlaaff⁴ describes in detail a series of experiments performed on mice and rabbits that led to the discovery of what he believes to be a successful antimorphin serum. By gradually increasing the dose of morphin in animals, a resistance substance is obtained which, when injected into other animals, will produce immunity to the action of morphin poison. Hirschlaaff tried his serum on a patient who had taken double the fatal dose of morphin. Two injections were given, and in 8 hours all symptoms of poisoning had disappeared. Several cases were treated in a like manner with excellent results.

Antiplague Serum.—Hornabrook⁵ presents some statistics showing the value of Haffkine's antiplague serum. In the city of Dharwar out of a population of 38,000 at the time of the outbreak of the plague in August, 1898, by January 4, 1899, 17,604 persons had been inoculated, 11,457 twice, and 6147 once—that is, more than half, for in the first fortnight of the outbreak over 10,000 persons fled from the city. Of those left in the city, among the uninoculated (by far the smaller proportion) there were 1189 plague attacks and 55 deaths; among the once inoculated 41 attacks and 21 deaths. The attacks among the twice inoculated were very few, notwithstanding their greater risk, for they were allowed to remain at home, while uninoculated were obliged to live in segregation camps. The mortality among the uninoculated was 77 %, among the once inoculated 39 %, and among the twice inoculated 51.25 %. The high mortality among the twice inoculated is attributed to the fact that most of these patients suffered from the pneumonic plague, a very fatal type of the disease. In Dharwar Hospital out of a staff of 32, about half were inoculated, and the remainder uninoculated. Of the latter, 6 contracted plague—4 of the pneumonic type—and all died; 2 bubonic cases recovering. Of the inoculated, not one contracted the disease. D. L. Cairns⁶ draws the following conclusions from an experience gained during the two recent outbreaks of plague in Glasgow: (1) That Yersin's serum is a remedy of the greatest value in the treatment of bubonic plague; (2) that its action is bactericidal, as shown by the degeneration induced in the bacilli, as well as antitoxic; (3) that this double action of the serum is best secured by its early administration in large doses, both subcutaneously into the lymphatic area which

¹ Bull. Gen. de Thérap., No. 10, 1903. ² Bull. Gen. de Thérap., No. 8, 1903.

³ Therap. der Gegenwart, No. 1, 1903. ⁴ Berl. klin. Woch., Dec. 8 and 15, 1902.

⁵ Australasian Med. Gaz., Dec. 25, 1902.

⁶ Lancet, May 9, 1903.

drains toward the bubo, and also intravenously; and (4) that in very mild cases subcutaneous injection alone will probably suffice, but in severe cases the combined method should be employed. For these latter the initial combined dose should be perhaps from 150 to 300 cc., the proportion given intravenously varying with the relative severity of the general symptoms.

Antipneumococcus Serum.—L. Panichi¹ reports the results of his clinical experience with a new antipneumococcus serum prepared in Tizzoni's laboratory. The serum was employed in 7 cases of pneumonia of a severe type with pronounced cerebral symptoms. The ages of the patients were from 14 to 42 years. In one case treatment was instituted too late to be of service. The author is convinced that this serum is of great value because it not only lowers the temperature, but also because it produces a direct effect upon the morbid process, softening and liquefying the exudate in the lung.

Antipyrin.—F. S. Pearce² believes that patients afflicted with functional nervous diseases not infrequently become the subjects of coal-tar derivative drug-habits owing to lax symptomatic treatment. He cites the case of a man, aged 27, who for 3 years had been taking as many as 150 antipyrin tablets a week for the relief of a neurasthenic headache. The symptoms of poisoning—marked cyanosis, sweating, hurried breathing, enfeebled circulation, and mental confusion—as well as the headache, disappeared upon the withdrawal of the drug and the institution of proper tonic and hygienic treatment. [See also "Acetanilid."] W. Sinkler,³ while deprecating the indiscriminate use of antipyrin and similar drugs, holds that these drugs are of the greatest usefulness in pains of nervous origin, such as migraine, headache, sciatica, lumbago, neuralgia, crises of tabes, and in ovarian and visceral pains. [All papers which point out that these substances are more useful as analgesics than as antipyretics are useful.]

Antiscarlatinal Serum.—E. von Leyden⁴ reports 16 cases of scarlet fever in which the course of the disease appeared to be considerably shortened by the use of blood-serum (10 to 20 cc.) taken from convalescent patients.

Antistaphylococcus Serum.—Pröscher⁵ states that he has produced in the goat a serum that will immunize rabbits against from 5 to 7 times the fatal dose of staphylococcus culture, when used in doses of from 1 to 5 cc.

Antistreptococcus Serum.—Meyer⁶ reports 18 cases of streptococcus infection treated with Aronson's serum. In 5 of the 18 cases beneficial results are said to have undoubtedly followed the use of the serum, in 2 the effect was doubtful, and in the remaining 11 none was produced. Three of the 5 patients successfully treated were suffering from facial

¹ Gaz. degli Osped., April 19, 1903.

² Therap. Gaz., Jan., 1903.

³ Therap. Gaz., Jan., 1903.

⁴ Deut. Archiv. f. klin. Med., lxxiii, 1902, Kussmaul Festschrift.

⁵ Deut. med. Woch., March 12, 1903.

⁶ Zeit. f. diet. und physik. Therap., April, 1903.

erysipelas, 1 from double suppurating tonsillitis, and 1 from puerperal fever.

Ogle¹ analyzes 19 cases of malignant endocarditis in which antistreptococcus serum was used. His conclusions are that the gravest symptoms, combined with streptococcus infection, even of the blood-stream, are not incompatible with recovery if treated by injections of antistreptococcus serum; that this is true also of malignant endocarditis, but that here the chances are probably less favorable on account of the colony of micrococci involved in the vegetations in constant contact with the blood-stream; that in malignant endocarditis staphylococci are frequent, or a mixed infection of staphylococci and streptococci; and if examination of the blood be negative, it would be prudent to use injections of antistaphylococcus serum together with antistreptococcus serum. D. Duckworth² reports a case of infective endocarditis in a boy, aged 15, successfully treated by rectal injections of antistreptococcus serum. Moser³ has employed in 84 cases of scarlet fever a serum obtained by immunizing horses with streptococci from the blood of scarlet-fever patients. Of these, 22 were light cases, 28 grave, and 34 malignant. Sixteen died, 15 of which belonged to the last class. The best results were obtained when the serum was used early and in large doses. All symptoms improved quickly. Normal horse serum and Marmorek's serum were tried without result. A. Baginsky⁴ reports 4 cases of scarlet fever treated with new Aronson antistreptococcus serum. The patients improved and finally recovered. He considers the new serum a success. G. A. Charlton⁵ has used an antistreptococcus serum, prepared under the direction of Hubbert, in 15 very severe cases of scarlet fever. Of these, 13 promptly ended in recovery, almost without complication. In not one of the 13 was there albuminuria or otitis media. The usual dose was 20 cc., repeated when necessary. Two deaths occurred. One of these patients was in a dying condition when admitted to the hospital, and lived only 4 hours. The other when admitted was suffering from pneumonia, and succumbed 5 days later to laryngeal diphtheria. S. Bonney⁶ has used antistreptococcus serum as a last resort in 25 cases of tuberculosis in which streptococci were abundant in the sputum. One case presented improvement so remarkable as to insure recovery. In another there was speedy termination of a streptococcal pneumonia, another recovered from severe septic pneumonia, 4 others showed marked improvement, 8 definite improvement, and 8 some improvement. In 3 cases the effect was doubtful and in 3 there were no results.

Antitoxin of Diphtheria.—Josias and Tollemer⁷ give statistics of 580 cases of diphtheria treated in the Hôpital Bretonneau during 1901-1902. The mortality was 13.1 %. Of the fatal cases, 18 were *in extremis* when admitted, making the mortality of the remaining cases 10 %. No complications imputable to the serum were observed except serum ery-

¹ Lancet, No. 11, 1903.

² Brit. Med. Jour., May 23, 1903.

³ Wien. klin. Woch., Oct. 16, 1902.

⁴ Berl. klin. Woch., Dec. 8, 1902.

⁵ Montreal Med. Jour., Oct., 1902.

⁶ Med. News, June 13, 1903.

⁷ La Méd. Moderne, Oct. 8, 1902.

thema, which appeared in 102 cases. The value of antitoxin is also clearly demonstrated in the returns of the Metropolitan Asylums Board, London.¹ In 1894, 3042 patients were treated in the Board's hospitals without antitoxin, the mortality being 29.6 %. In 1901, 6499 patients were treated with antitoxin in the same hospitals, the mortality being 12.5 %. In 753 laryngeal cases the mortality was 21.1 %. At Brook Hospital 723 cases were treated with antitoxin. The mortality percentage of the first day cases (38) was 0.0; of the second day (170 cases) 4.1; of the third day (192 cases) 11.9; of the fourth day (137 cases) 12.4; and of the fifth and subsequent days (186 cases) 16.6. *For five consecutive years there has not been a death at this hospital among the cases that came under treatment on the first day of the disease,* and of those coming under treatment on the second day the mortality has not exceeded 5.4 %. The Report of the State Board of Health of Massachusetts is no less favorable to the antitoxin treatment. According to this report, the mortality of diphtheria from 1891 to 1894 was 28.3 %. In 1895, when antitoxin was introduced throughout the State, the fatality at once fell to 18.9 %, and during the next six years the percentage declined from 15.1, 14.1, 13.2, 11.6, 10.2 to 10.5. R. Rudolph² states that in 42 cases of diphtheria treated with antitoxin in the Victoria Hospital, Toronto, between January 1 and July 1, 1902, there was but one death, and that this occurred in a young girl who had a history of nephritis prior to her attack of diphtheria. M. H. Fussell³ gives the following rules, which should be observed in every case: A culture should always be made in throat cases; antitoxin should be given at the time of making the culture; the dose should be 2000 units, and if no improvement follows in 6 hours, this dose should be repeated. Two thousand units should be administered every 12 hours thereafter until improvement begins. Notwithstanding the cumulative testimony of reports published both in Europe and America, Kassowitz⁴ reiterates his former claims and endeavors by statistical studies to maintain his position that the diphtheria serum is of little, if of any, service. Cairns⁵ believes that when the infection is at all advanced or malignant, the antidiphtheric serum should be given by intravenous injection. He is also convinced that very much larger doses should be used than those which are often employed. He recommends 20,000 to 25,000 units as an initial dose in grave cases. J. O'Malley⁶ has employed diphtheria antitoxin in bronchopneumonia with excellent results, and reports three cases. He thinks we have it in a most valuable therapeutic agent for a class of cases otherwise beyond therapeutic aid, especially those cases of bronchopneumonia which so often cause a fatal complication in the bacterial diseases of childhood, such as measles, influenza, pertussis, and scarlet fever.

Wassermann,⁷ by immunizing animals by means of dried and crushed diphtheria bacilli to which a certain amount of diphtheria antitoxin has

¹ Brit. Med. Jour., March 14, 1903.

² Brit. Med. Jour., May 9, 1903.

³ Phila. Med. Jour., Oct. 25, 1902.

⁴ Therap. Monatshefte, vol. xvi, 1902

⁵ Lancet, Dec. 20, 1902.

⁶ Amer. Med., Jan. 17, 1902.

⁷ Deut. med. Woch., No. 44, 1902.

been added, has obtained a serum which is bacteriolytic to diphtheria bacilli, causing agglutination and sedimentation of the latter. The author expresses the hope that this serum may prove valuable in the treatment of diphtheria, since by its means we may bring about the destruction of the diphtheria bacilli after the neutralization of their toxins has been accomplished by the antitoxin.

Antityphoid Serum.—A. E. Wright¹ publishes two new statistical reports from the British War Office with reference to the results of antityphoid inoculation in the army in India and Africa. Of 55,955 uninoculated soldiers in India, 744 contracted typhoid fever and 199 died: an incidence rate of 1.33 and a death-rate of 0.36. Of 4883 inoculated against the disease, only 32 contracted it, with 3 deaths: an incidence rate of 0.66 and a death-rate of 0.06, the former being decreased by one-half, and the latter by five-sixths. Of 10,981 inoculated soldiers in South Africa, 257 contracted the disease: an incidence rate of 2.3. Of 2535 inoculated, only 26 had typhoid: an incidence rate of 1, and a diminution of more than one-half.

Chantemesse² reports 507 cases of typhoid fever treated with his serum, in which there was a mortality of 6 %, and compares this with one of 19.3 %, an average obtained from 1192 cases occurring in 17 different hospitals where his serum was not employed. Animal experimentation has led the author to believe that the serum exerts its influence principally by exciting phagocytosis, but that it also possesses some direct antitoxic action.

A. Macfadyen,³ having demonstrated by experimentation that the specific toxin of typhoid bacilli is intracellular and not extracellular, has obtained from typhoid bacilli, by disintegrating them in liquid air, a toxin which an inoculation into animals in small doses invariably proves toxic or fatal. He has also found that the injection of this toxin into monkeys renders the blood-serum of those animals both antitoxic and bactericidal, and, further, that if an animal inoculated with a lethal dose of living bacteria were, after half the time had elapsed necessary to bring about death, injected with this serum it recovered. A. E. Wright⁴ contends that there is nothing novel in the vaccine devised by Macfadyen except that it is prepared with liquid air, and that those engaged in medical research must emphasize in season and out of season that there is absolutely no outlook for the successful practical exploitation of an antitoxic serum against any disease unless, as obtains in the case of antidiphtheria serum, the quantity of antitoxin contained in the few cubic centimeters of foreign blood which can be inoculated into the patient is sufficiently considerable to neutralize at least a substantial fraction of the bacterial toxin generated in his system.

Apocodein.—W. E. Dixon,⁵ as the result of an experimental study, states that apocodein lowers blood-pressure, produces vasodilation, and increases peristaltic movements—all probably as a result of its sedative

¹ Brit. Med. Jour., Oct. 10, 1903.

² La Presse Méd., Dec. 24, 1902.

³ Brit. Med. Jour., March 21, 1903.

⁴ Brit. Med. Jour., April 4, 1903.

⁵ Brit. Med. Jour., Oct. 18, 1902.

action in sympathetic inhibitory ganglions. It does not produce vomiting or other ill effects. The author hopes that the drug will receive an extensive trial as a hypodermic purgative, and suggests that a 1 % or 2 % solution of the hydrochlorid be used, which should be neutral, and filtered before injection. Two or three cc. is recommended for a dose.

Apocynum Cannabinum.—R. R. Paine¹ believes that this remedy has not taken the rank it deserves, and attributes this in part to the inferior preparations which are frequently dispensed. He recommends the administration of the fluid extract in capsules as the best way of avoiding the nausea that so frequently attends the use of the drug. He cites a case of mitral disease with nephritis in which other diuretics had proved useless, but in which, under the influence of apocynum (8 drops of the fluid extract every 4 hours), the urine was increased from 6 ounces to 130 ounces daily.

Argyrol.—This is a compound of silver and a proteid derived from wheat, containing 30 % of the metal. It does not coagulate albumin nor precipitate chlorids, and is quite free from irritant properties. G. K. Swinburne² concludes from a study of the action of argyrol in 350 cases of gonococcus infection that the drug has decided gonococcidal powers; that it has a marked effect in allaying the inflammation of the disease; that the injection can be repeated almost as frequently as the fancy of the physician dictates; and that no unpleasant symptoms result from the injections. In the beginning of the disease his patients were given a single daily injection of 2½ to 3 drams of a 1 % solution, which was held by the patient for 10 minutes in the anterior urethra. Cases in which the posterior urethra was involved received, in addition, a deep instillation of 1 ounce of the solution. R. O. Kevin,³ from an experience with argyrol in the treatment of 2500 cases of acute and chronic gonorrhreal infection, is also favorably impressed with the action of the drug. In acute cases he uses injections of 2 %, 3 %, 5 %, or 20 % solutions, according to the financial condition of the patient, always preferring, however, the stronger solutions. In cystitis he irrigates the bladder with a saturated solution of boric acid, and then injects a solution of argyrol (½ to 1 ounce of a 10 % to 20 % solution), allowing it to remain in the bladder. In chronic posterior urethritis he applies by means of cup sounds an ointment of argyrol (20 % in lanolin). [This remedy is now apparently established on a firm basis.]

Aristoquinin.—This compound is chemically diquinin carbonic ether. It occurs as a white, tasteless powder, insoluble in water, and containing about 96 % of quinin. According to H. Stursberg,⁴ when 5 grains are given on an empty stomach, quinin can be detected in the urine in half an hour, though the reaction is never so intense as after the same amount of quinin muriate. In order to test the value of the drug, the author employed it in a number of cases of pertussis, and noticed that in all a diminution in the number of attacks took place, and that they

¹ St. Louis Courier of Med., Jan., 1903.

³ Med. Rec., June 6, 1903.

² Med. Rec., Oct. 11, 1902.

⁴ Münch. med. Woch., Nov. 11, 1902.

often appeared in their original frequency when the administration was stopped too soon. Gastric disturbances did not occur nor were any bad after-effects noticed. N. Swoboda¹ has also used aristoquinin in 10 cases of pertussis with good results. For children under 1 year he advises daily doses of 5 grains, and in older children not over 15 grains a day.

Arsenic.—F. M. Pope² reports on 12 years' experience in the treatment of chorea by rapidly increasing doses of Fowler's solution. He prescribes the remedy in a much diluted form and in the same dilution throughout. He usually gives $2\frac{1}{2}$ minims of Fowler's solution in 1 ounce of water as the first dose to a young child, and when increasing the dose gives a larger quantity of the same mixture. For example, a child of 5 years would have 1 ounce 3 times a day on the first day, 2 ounces as frequently on the second, 4 ounces on the fourth, and so on as long as no unpleasant symptoms appear. During the treatment the child is confined to bed and restricted to bland food. According to the author, patients so treated show marked improvement in 3 or 4 days. H. Cybulski³ has been using sodium arsenate with marked success in phthisis. He administers it hypodermatically in the following solution: sodium arsenate, 3 grains; carbolic acid (0.5 %), 5 drams. One and a half minims are injected once daily, and the dose doubled every second day until 15 minims are reached.

Aspidium.—W. Straub,⁴ as the result of his experiments with the extract of male-fern, finds that of the various principles contained in the drug phloroglucin, filicinic acid and butyric acid are inert; and of the remainder, filicinic acid butylamin is least active, and that then follow aspidinal, flavaspidic acid, albaspidin, and finally filicic acid as the most potent. A number of nonvertebrates were tested, and in all, with the exception of certain echinodermata, the great virulence of male-fern was demonstrated, and its active principle proved to be strong poison for all kinds of organized plasma, but more particularly for muscle-tissue. This was beautifully shown in the case of worms, and the empiric use of male-fern as an anthelmintic finds its scientific proof in these experiments. Since the general experience was that pure filicic acid was much less reliable for therapeutic purposes than the extract, attempts were made to follow its destiny in the organism, and it was found that most of it suffered decomposition, most probably in the intestines.

Aspirin.—R. T. Williamson⁵ has used aspirin (acetyl salicylic acid) in 11 cases of diabetes mellitus. In the severe forms the drug was without influence on the glycosuria, in mild cases the sugar elimination was clearly diminished. He does not think that aspirin has any advantage over sodium salicylate, except that it produces less gastric disturbance and is less liable to excite toxic symptoms. Large doses, however, sometimes produced the same toxic effects as other salicylic compounds. He recommends 10 grains 2 or 3 times a day, cautiously increased to 15

¹ Wien. klin. Woch., March 5, 1903. ² Brit. Med. Jour., No. 2181, 1902.

³ Münch. med. Woch., vol. xix, 1902.

⁴ Arch. f. Exper. Path. u. Pharm., Bd. xlvi, 1902.

⁵ Brit. Med. Jour., No. 2191, 1902.

grains, 4, 5, or 6 times a day, if no untoward effects appear. G. F. Smith¹ has found aspirin a potent remedy in rheumatism, especially in cases in which the salicylates have proved inefficient, and in chronic, subacute, and abarticulär forms of the disease. Otto² reports a case in which 15 grains of aspirin was shortly followed by violent itching and tense swelling of the skin, and a second dose by edema, itching, thirst, dizziness, and vomiting. A similar case has been reported by Meyer.

Atropin.—H. Gebele,³ from a careful study of the subject, concludes that the dominant action of atropin upon the intestines is paralyzing and not stimulating. P. Ostermaier⁴ reports 6 cases of incarcerated hernia which underwent spontaneous reduction after the hypodermatic administration of from 1 to 4 milligrams of atropin. He is of the opinion that atropin is an intestinal stimulant and that its good effects in ileus are to be attributed to constriction of the mesenteric vessels, and therefore indirectly to a lessening of the swelling in the strangulated gut. J. Pal⁵ summarizes as follows the results of experiments he has been conducting since 1899: As a rule, atropin injures the end-apparatus of the vagus and the splanchnics, and under certain conditions paralyzes them completely. The muscle of the intestinal wall and the ganglion which controls peristalsis remain unaffected. The tonicity of the bowel is manifestly though sometimes only temporarily reduced, and the bowel is likewise less susceptible to inhibitory reflex excitation. Therefore, in those cases in which such excitation is present, its administration produces a more favorable condition for intestinal movement. This exciting condition, however, must be present whether it be due to pathologic causes or whether it be purposely induced. He believes that atropin may be given with advantage in paralytic obstruction of the bowel, a condition in which the intestine is under the influence of a reflex excitation, but that it should be withheld in those cases of mechanical ileus in which there is a true stenosis, although its favorable administration may be possible in such analogous cases as incarcerated external hernia, in which the circulation of the constricted loop of bowel is preserved.

C. S. Potts⁶ reports a case of spasmodic torticollis which had persisted for a year, and which finally yielded to intramuscular injections of atropin — $\frac{1}{200}$ of a grain daily, gradually increased until at the end of 3 weeks $\frac{1}{45}$ of a grain was used.

Barium Chlorid.—Schedel⁷ has employed barium chlorid in doses of from $\frac{1}{3}$ to $\frac{2}{3}$ grain in 19 cases of cardiac disease. He finds that the drug regulates the rhythm of the pulse, increases its volume, and raises the blood-pressure, and that the indications for its use are the same as those for digitalis. In small doses the drug does not disturb the stomach. [Pharmacologists, who have found so much disturbance caused by small quantities of barium salts as impurities in various substances, will scarcely agree with these statements.]

¹ Northwestern Lancet, Dec. 15, 1902. ² Deut. med. Woch., Feb. 12, 1903.
³ Münch. med. Woch., Oct. 21, 1902. ⁴ Münch. med. Woch., Sept. 2 and 9, 1902.
⁵ Münch. med. Woch., Nov. 25, 1902. ⁶ Univ. of Penna. Med. Bull., April, 1903.
⁷ Deut. med. Woch., No. 13, 1903.

Bismuth.—G. Fuchs¹ has been studying the action of bismuth in cases of gastric ulcer, and has established that the drug furnishes not merely mechanical protection for the diseased part, but that it has also a specific influence. It is decomposed by the mucus into bismuth oxydul, which penetrates into the granulation tissue and forms a protective for it. Chalk and magnesia are not capable of being substituted for bismuth, as they lack the specific properties of the latter. Bismutose [see below] is regarded by the author as the most useful preparation of bismuth on account of its easy reducibility.

Bismutose.—This is an insoluble, odorless, and tasteless bismuth-albumin compound. H. Starck² has used it in 37 cases in children, comprising cholera morbus (10 cases), chronic arteritis (6 cases), acute intestinal catarrh (17 cases), and gastric ulcer (4 cases). The usual dose was 10 grains in mucilage, hourly. The results were excellent.

Bromids.—R. Defendorf³ calls attention to the abuse of bromids in the treatment of mental disease and reports 5 cases in which the administration of bromids resulted in evil consequences. [S. Weir Mitchell reported in the "University Medical Magazine" for June, 1896, a series of cases in which the administration of bromids produced serious untoward effects, such as extraordinary feebleness of mind, grave melancholy, and even homicidal delirium.]

L. P. Clark⁴ calls attention to the importance of restricting the ingestion of sodium chlorid in the diet of epileptic patients who are taking bromids. He states that bromin can replace chlorin in the body-tissues and that under the salt-starvation plan of treatment from 20 to 60 grains of bromid are quite as efficacious in controlling epileptic seizures as from 60 to 160 when the salt is not withheld. [The value of semisalt starvation as an adjuvant to the bromid treatment, originally advocated by Tolous and Richelet, has been amply confirmed.]

Bromoform.—H. K. Dillard⁵ reports a case of bromoform poisoning in a child of 16 months. Four drops were given for the purpose of allaying cough, and 2 hours later a second dose of 4 drops (not the last in the bottle) was given. A few minutes after the administration of the second dose the muscles relaxed, the skin became cold, and unconsciousness followed. When seen a half-hour later, the child presented pin-point pupils, a weak irregular pulse, shallow respiration, and cyanosis. Under lavage, artificial respiration, and the hypodermatic use of stimulants recovery followed in a few hours.

Bromopin.—This is a combination of bromin (10 %) with oil of sesame. W. P. Spratling,⁶ of the Craig Colony for Epileptics, claims that it does not produce acne; does not impair digestion; does not suppress or pervert any of the functions of the mind or body, and with it all is a good reconstructive in feeble cases if given in the form of an emulsion. J. Möller⁷ and Honigschnied⁸ also speak favorably of the

¹ Deut. med. Woch., April 2, 1903.

² Münch. med. Woch., Nov. 25, 1902.

³ Amer. Med., Nov. 29, 1902.

⁴ N. Y. Med. Jour., Jan. 10, 1903.

⁵ Therap. Gaz., April 15, 1903.

⁶ Amer. Med., Jan. 10, 1903.

⁷ Klin.-ther. Woch., No. 3, 1903.

⁸ Aerztl. Rund., No. 6, 1903.

action of bromopin in epilepsy. A. Rahn¹ reports good results from the use of bromopin enemas in convulsions, especially in infants. He gives nurslings per dose as many grams as they are months of age, and to children from 1 to 4 years of age from 2½ to 4 drams.

Cacodylates.—Gautier² has introduced under the name of arrhenal another organic compound of arsenic-disodic-methyl-arsenate, as a substitute for the cacodylates or dimethyl arsenates. He claims for this salt that while it is nontoxic, it possesses the therapeutic potency of arsenic, and that it has an advantage over the cacodylates in so far that it may be used not only by subcutaneous injection, but also by mouth administration. Gautier claims to have used arrhenal with great success in a number of diseases in which arsenic has been useful, especially in 9 cases of pernicious malaria which had resisted the action of quinin. T. R. Fraser³ has shown that cacodylates, even in enormous doses, are inert because the arsenic ion has formed so firm and stable a union with the other ingredients of the compound that no dissociating influence to which they are subjected in the body is able to set free the active arsenic compound from the combination. Not only did he fail to obtain any therapeutic results from their use, but he was also unable to detect by the usual tests arsenic in the urine of patients to whom they were administered. His experiments prove what might confidently have been anticipated, that if arsenic is so firmly united with other bodies as to be incapable of producing toxic action, it is not capable of exerting therapeutic influence.

Calcium Carbonate.—A. C. Croftan⁴ comes to the following conclusion regarding the relation of calcium salts to the formation of uric acid calculi: Uric acid of the urine is held in solution by disodium phosphate and is precipitated by monosodium phosphate. For the prevention of calculi an increase of the former or a decrease of the latter is a desideratum. This object can be accomplished either by decreasing the phosphoric acid or by increasing the sodium of the urine. Calcium salts produce the desired effect by decreasing excretion of phosphoric acid through the kidneys: (a) by binding the preformed phosphates of the food and preventing their absorption, and (b) by binding the phosphates of the blood and causing their elimination through the bowel. The administration of sodium salts increases the diphosphate and decreases the monophosphate, but is objectionable because sufficiently large doses render the urine permanently alkaline, a deleterious effect not produced by the use of calcium salts. According to Croftan, the best salt of calcium is the carbonate, which may be given in doses of 15 to 20 grains, thrice daily.

Calomel.—C. Bertazolli⁵ holds that calomel is of great service in pneumonia. It causes revulsion in the intestines, he asserts, thus diverting blood from the lung and averting the danger of pulmonary edema, carries out of the body a quantity of toxins, and also exerts a micro-

¹ Therap. der Gegenwart, No. 1, 1903.

² Arch. de Parasitologie, June, 1902.

³ Scottish M. and S. Jour., March, 1903.

⁴ Jour. Am. Med. Assoc., March 28, 1903.

⁵ Gaz. degli Osped., No. 8, 1903.

bicidal action. S. Schoen-Ladviewski¹ prefers castor oil to calomel as a laxative, but expatiates on the marvelous action of the latter in flatulent colic, dyspepsia, febrile gastrointestinal catarrh, convulsions from indigestion, icterus, and syphilitic and serofulous eye affections. He states that traces of sublimate develop in mixtures of calomel and sugar in time [also after prolonged trituration], and hence such mixtures should always be made up fresh; and that salt and salted foods, bitter almonds, iodin, and ammonium chlorid have a tendency to transform part of the calomel into sublimate. M. Tiptzeff² reports excellent results from intramuscular injections of calomel in a case of elephantiasis. The patient was a syphilitic, but the syphilis had been acquired after the development of the elephantiasis. About $\frac{3}{4}$ of a grain of calomel in vaselin was administered every second to fourth day for $3\frac{1}{2}$ months. Tchlenoff³ also reports a case of elephantiasis in a syphilitic notably improved by subcutaneous injections of calomel. E. Lesser⁴ has observed a number of cases of syphilis in which injections of calomel caused disagreeable by-effects and even severe intoxication. He believes, however, that such injections are very useful when absolutely indicated, but that they should be reserved for exceptional cases. S. Johns⁵ has used for many years with great success applications of dry calomel in the treatment of pruritus ani. He has the patient wash the anus after each evacuation, dry it with absorbent cotton, and apply about 20 grains of calomel with the fingers.

Camphor.—H. Winterberg⁶ tabulates the results of the administration of camphor to 100 rabbits, cats, and dogs as manifested on the heart and vessels. Nothing was observed in a single instance which indicated that the heart action was modified by the camphor either favorably or unfavorably. The blood-pressure in the auricles and arteries showed no marked divergence from normal. The cause for the lessened arterial tension after the administration of camphor is obviously due, according to the author, to dilation of the smaller arteries. This dilation is not general, the splanchnic vessels apparently being exempt. The action of the camphor on the vasmotor center was not constant. J. Hofmann⁷ recommends camphor in the treatment of morphinism. In the healthy subject, he asserts, camphor causes vascular constriction with increased blood-pressure. Morphin causes the reverse, but in the subject of morphin-poisoning morphin has the same action as camphor—namely, that of a vasoconstrictor. Hence the author tried the effect of camphor in replacing morphin in a habitué. The result was that the usual severe symptoms on withdrawing morphin were almost entirely missed. [This is a discrepancy between theory and practice which needs investigation.]

Cancroin.—A. Adamkiewicz⁸ claims to have cured 6 cases of cancer, 2 of which had been declared inoperable by Nothnagel and Eiselsberg,

¹ Jahr. f. Kinderheilk., No. 2, 1903.

² Medizinskol Obozryenil, No. 11, 1903.

³ Therap. Gaz., May 15, 1903.

⁷ Therap. Monats., July, 1902.

² Medizinskol Obozryenil, No. 9, 1903.

⁴ Therap. der Gegenwart., Jan., 1903.

⁶ Arch. f. d. Phys., No. 10, 1903.

⁸ Berl. klin. Woch., July 7, 1902.

with cancroin—a toxin obtained from fresh cancer-cells. Nothnagel and Eiselsberg¹ disclaim this fact, and quote from their notes to the effect that the cases in question were merely treated medicinally, with suspicion of possible cancer. Poten and Schultzenstein² and J. Decker³ also report negative results from the use of cancroin in cancer.

Carbolic Acid.—In 1899, G. Baccelli⁴ reported 40 cases of tetanus treated with subcutaneous injections of carbolic acid, and of these but one died. D. Symmers⁵ has collected from literature 42 additional cases; in 16 death occurred, a mortality of 38.1 %. According to G. W. Norris,⁶ 7 cases have been treated in the Pennsylvania Hospital by the Baccelli method, with a mortality of 85 %. [Much of the testimony favorable to the Baccelli treatment has emanated from Italy, that from other countries being distinctly less favorable. It may be, as Pfeiffer suggests, that tetanus in Italy pursues a milder course than in other countries or, as it seems to us, the mortality varies largely according to the time of commencing treatment.]

Duhr⁷ reports 4 cases of smallpox in which he applied pure carbolic acid to the papules with marked success. The acid was applied carefully with a small camel's-hair brush. The excellent results obtained with carbolic acid in the treatment of certain pustular skin diseases led the author to try the remedy in smallpox. He claims that the treatment averts suppurative fever, destroys the offensiveness of the pustular stage, and prevents pitting.

Chloralose.—M. Bresson⁸ draws the following conclusions from a study of the action of this drug in mental affections: Chloralose is a good hypnotic, producing calm sleep without trace of fatigue on awaking. It is indicated in rebellious insomnia, with or without agitation, especially in hysteria, and perhaps in general paralysis. The principal contraindications are diseases of the respiratory tract, especially advanced phthisis, and mental diseases with intense hallucinations. The dose of chloralose is from 3 to 12 grains, the effects of the latter dose being very carefully watched.

Chloroform.—C. S. Sherrington and S. C. M. Sowton,⁹ from a series of experiments performed upon the isolated mammalian heart, appear to have established the fact that it is the dose of chloroform which circulates through the heart and not the length of time during which the fluid circulates that is important. After a sufficiently long time the effect is lessened and an apparent "immune" condition appears. But when strong solutions are used quite different effects make their appearance. In a period of time differing according to the dilution of the chloroform perfused the ventricle and auricle stopped absolutely. To a certain point recovery was possible when the chloroform was washed away by undrugged fluid, but when a certain dose was reached no such recovery

¹ Berl. klin. Woch., July 11, 1902.

² Ibid.

³ Münch. med. Woch., Dec. 23, 1902.

⁴ Riforma med., vol. iii.

⁵ Amer. Med., Aug. 15, 1903.

⁶ Phila. Med. Jour., May 16, 1903.

⁷ Lancet, Feb. 21, 1903.

⁸ Bull. Gén. de Therap., vol. exliv, No. 12, 1902.

⁹ Brit. Med. Jour., July 8, 1903.

took place. When the solutions were of a certain dilution, the mere fact of their being circulated for a prolonged period did not appear to hinder recovery of the heart-muscle as soon as the conditions were favorable. Concerning the effect of chloroform upon the inhibition of the heart no very definite results were obtained, yet electric excitation of the nerves increasing the heart's movements could, even when the heart was brought to a standstill by chloroform, reinitiate and maintain active rhythmic cardiac contractions even when the heart was flaccid. The special Chloroform Committee of the British Medical Association¹ in its second report insists upon the absolute necessity of accurate dosage in the case of chloroform, and demands an apparatus which shall enable the administrator to maintain the dose within such limits as will, on the one hand, give an adequate anesthesia, and, on the other, not endanger life. Safety is held to be largely a question of dosage, by which the committee does not mean any quantity of the drug, but its percentage mixed with air. Even a very small quantity will kill when given in concentrated form, while a comparatively large amount is absolutely safe if presented in a vapor below 2 %. Experts writing for the committee claim that while for most patients 2 % or less will be adequate to induce, 1 % or less will maintain, anesthesia. E. Lawrie² criticises the report of the committee and contends that no apparatus can regulate the intake of the anesthetic by the patient, and that nothing can insure safety in the matter of dosage but regularity of breathing, and to maintain this requires the undivided attention of the chloroformist. Any apparatus, he believes, would prove dangerous, in that it must distract the chloroformist's attention from the all-important respiration. A. B. Green³ has found that a saturated solution of chloroform has the same effect as glycerin in eliminating extraneous organisms from vaccine virus, and, moreover, acts more quickly, that is, in from 1 to 6 hours. The author claims that vaccine prepared by the chloroform process can be used at once before its activity has deteriorated, and considers that this method will be found especially valuable when there is urgent demand for a rapid supply of lymph, such as may arise during smallpox epidemics.

Cocain.—G. K. Dickinson⁴ states that the chief dangers in spinal cocainization are cardiorespiratory complications, but that from his experience in a series of over 200 cases no anxiety need be felt. In his cases there was neither dyspnea nor palpitation. In his earlier cases vomiting was frequent and persistent, but in the last 135, with the removal of the same amount of spinal fluid as the quantity injected, this phenomenon has been quite unusual. The author prefers cocaine analgesia to ether in all cases in which the patient will not have to be overmuch mentally disturbed by the time and surroundings. E. D. Martin⁵ believes that untoward symptoms in spinal cocainization are due to disturbed tension of the spinal fluid, and to some extent to the position of the patient, gravity allowing the fluid to reach the upper part of the cord when the

¹ Brit. Med. Jour., July 8, 1903.

² Brit. Med. Jour., Aug. 1, 1903.

³ Lancet, June 20, 1903.

⁴ Med. Rec., Feb. 7, 1903.

⁵ New Orleans M. and S. Jour., April, 1903.

head is low. He therefore employs concentrated solutions of cocaine (5 minimis of a 2 % solution for operations about the rectum and the same quantity of a 4 % solution for operations upon the extremities) and keeps the head and shoulders elevated for several hours after operation. Brief notes of 18 cases, practically all of which were free from after-effects, are appended. Racoviceano-Pitesci¹ reports briefly 406 cases of spinal anesthesia without a death. A solution of from $\frac{1}{6}$ to $\frac{1}{3}$ of a grain of cocaine, made up with cerebrospinal fluid previously withdrawn, was used in all his cases. In the discussion which followed, Jonnescos reported 8 cases with one death. In the latter death was attributed directly to the cocaine. Jonnescos has abandoned the method. Sevrieana also reported 30 cases with one death, and stated that in his hands spinal cocaineization had proved very unsatisfactory. Leguere² records 2 instances of immediate death caused by spinal injections of cocaine. [Further observations are necessary to establish this as a method by choice. Thus far its dangers have been demonstrated.]

Compressed Air.—J. T. Corning³ in a paper published in 1891 demonstrated that the physiologic effects of ammonia, alcohol, ether, and other stimulants were augmented when administered to patients remaining in compressed air. This phenomenon the author attributes to a retardation of the circulation, which permits the drug to linger beyond the ordinary in the field of action. He now brings forward some further observations.⁴ He has found that the power of compressed air to increase the effect of remedies upon the cerebrospinal axis may be heightened by the simultaneous exhibition of substances which dilate the capillaries. He describes an apparatus which has been used in 6000 cases without any ill effects. The conclusions are summarized as follows: (1) Limitations of the method. The plan of treatment is of no use whatever in the management of the inflammatory and degenerative conditions of the cerebrospinal axis. The contraindications are disseminated sclerosis, spastic spinal paralysis, poliomyelitis, accidents and diseases of the bloodvessels, neuritis, rheumatism. (2) Legitimate sphere of action includes cerebrospinal affections of a functional character in which pain, exhaustion, insomnia, or depression are prominent features. Here the effects are striking and quite beyond those obtained in any other way. Finally, compressed air, by increasing the pressure in the renal vessels, gives rise to diuresis. This effect, obtainable from the air alone, becomes exceedingly pronounced when a diuretic is given even in insignificant doses.

Cryogenin.—This is benzamido-semicarbazide. It is a white, crystalline powder with a slightly bitter taste. Gélibert⁵ prefers it as an antipyretic on account of its feeble toxicity and solubility.

Dionin.—J. Weigl⁶ states that dionin (mono-ethyl-ester of morphin hydrochlorid) is not nearly so toxic as morphin; that sleep frequently

¹ Bull. et Mem. de la Soc. de Chir. de Bucarest, Dec., 1901.

² International Clinics, vol. ii, 1902.

³ Med. Rec., Aug. 29, 1891.

⁵ Lyon Médical, Dec. 14, 1903.

⁴ Amer. Med., April 4, 1903.

⁶ Wien. klin. Rundschau, Nov. 30, 1902.

accompanies its administration; that this sleep is quieter and more refreshing than that induced by morphin; and that dizziness and headache are rarely observed. The author has found the drug very useful in the diseases of children, especially in whooping-cough. The course of the disease was not materially shortened, but the severity and the number of the paroxysms were distinctly lessened.

Euquinin.—This is the ethy-carbonic ether of quinin. It is a crystalline substance, readily soluble in alcohol and ether, but only slightly soluble in water. Its chief advantage over quinin is its tastelessness. It is more than twice as costly as quinin and less than half as active. Audrey,¹ L. De Carlo,² and J. Aguilar³ report cases illustrating the efficacy of euquinin in the treatment of malaria in children. D. Ferrúa⁴ also reports favorably upon the use of euquinin in whooping-cough. [The claim that it does not produce tinnitus has not been substantiated.]

Epicarin.—This is said to be a condensation product of creotinic or creasotinic acid and beta-naphtol, and to combine the properties of creosote and naphtol. A. Van Harlingen and H. K. Dillard⁵ conclude from their experience with the drug that in the form of a tincture (10 % to 20 %) epicarin appears to have decided value in ringworm of the scalp, and that it acts more rapidly than any of the remedies heretofore employed; that in ringworm of the body and in scabies epicarin is apt to prove irritating, and is not equal to most of the remedies ordinarily employed. In a single case of favus the results were encouraging.

Ergot.—Palm,⁶ from studies on the effects produced by different preparations of ergot, concludes that chrysotoxin is an efficient principle, and that sphacelotoxin is the most advantageous of all the preparations. In doses of from $\frac{1}{100}$ to $\frac{1}{10}$ of a grain it produces prompt uterine contractions, and has little effect on the general condition of the patient. The author regards the hypodermic use of ergot as far superior to the administration of ordinary preparations by the mouth. A. T. Livingstone⁷ contends that many disorders usually regarded as purely nervous disturbances are in reality due to faulty circulation, and that ergot, through its constricting effect upon the vessels, proves a most satisfactory remedy. He has used it with excellent results in a long list of affections, including insomnia, headaches, opium poisoning, delirium tremens, hysteria, chorea, angina pectoris, typhoid fever, and acute inflammations. The same author⁸ recommends the use of ergot in pneumonia on the ground that the chief underlying condition in this disease is dilation of the bloodvessels. He claims that the free hypodermatic use of the drug in the first stage will abort the attack or markedly limit the extent of the second stage.

Eustace Smith⁹ states that ergot acts more quickly than arsenic in

¹ Lyon Médical, Dec. 28, 1902.

² Gaz. degli Osped., No. 141, 1902.

³ Revist. Valenc. de Cienc. Med., No. 36, 1902.

⁴ Revist. Valenc. de Cienc. Med., Nos. 42, 43, 1902.

⁵ Am. Jour. Med. Sci., June, 1903.

⁶ Monats. f. Geburt. u. Gynäk., Bd. xvi, Heft 5, 1902.

⁷ Jour. Am. Med. Assoc., March 21, 1903.

⁸ N. Y. State Jour. of Med., May, 1903.

⁹ Brit. Med. Jour., July 18, 1903.

chorea, never disagrees, and is successful when arsenic is given in vain. The author gives 1 dram of the liquid extract, diluted, every 3 or 4 hours, and enforces complete rest in bed. In some cases he has given as much as 1½ drams every 2 hours without exciting untoward symptoms.

Erythrophleum.—This is the bark of the *Erythrophlaeum guineense*, growing in Africa. It is also known as gidu, doom, ordeal, casca, and saucey bark. It contains an alkaloid, erythrophlein, which is soluble in water and alcohol. From a clinical study of its action in 9 cases of heart-disease, R. W. Wilcox¹ concludes that the indications for its use are a rapid, low-tension pulse with venous congestion. As compared with digitalis it is decidedly more active in slowing the pulse; it also irritates the stomach more, and, therefore, is more likely to cause vomiting, and possesses a more disagreeable taste. As a vasoconstrictor it has greater effect than digitalis; in fact, as great as digitalis and ergot combined. It is less cumulative than digitalis. It seems to act rather upon the inhibitory than on the muscular system. As to constancy of effect in slowing the heart, strengthening the pulse, and promoting diuresis, digitalis is rather more reliable. The use of this remedy, then, should be confined to those cases of fairly competent heart with low vascular tension, in which it will show its effects more rapidly and markedly, and to those cases in which digitalis has lost its usefulness or has utterly failed. The dose employed was usually 10 drops of 10 % tincture in a wineglass of water after meals.

Ether.—C. Longard² concludes from 2700 anesthesias that ether is the safest and best anesthetic, while the annoying features following its use are due to carbonic-acid poisoning. Plenty of air must therefore be allowed the patient receiving ether. The author has devised a mask which permits free access of air, and he predicts that in time ether will supplant all other anesthetics. G. Spencer³ presents a paper on the selection and administration of anesthetics based upon an experience of 2000 cases. He states that patients with a weak heart-action, provided the heart be not fatty, take ether well and do not need stimulation. Young muscular men take anesthetics badly, yet ether is the only safe drug to administer to them. The struggling and deep inspirations make chloroform dangerous. The author believes that it is dangerous to follow ether with chloroform, but that administration of ether after chloroform is not objectionable. For operations on the kidneys, Spencer prefers chloroform; for laparotomies and operations on the brain, ether. In empyema, if there be marked dyspnea, he advises the use of a local anesthetic, and if the dyspnea be not marked, chloroform. H. H. Everett⁴ reports a case of ether asphyxia in a patient being operated on for gangrenous appendicitis. Respiration finally ceased, and for 4 hours artificial respiration and adrenalin chlorid, strychnin, etc., were employed. The patient recovered, which Everett attributed largely to adrenalin.

H. J. Pechell⁵ has studied the effect of ether administration on nitrog-

¹ Amer. Med., June 27, 1903.

³ Amer. Med., July 11, 1903.

² Münch. med. Woch., June 16, 1903.

⁴ Med. Rec., May 23, 1903.

⁵ Brit. Med. Jour., June 20, 1903.

enous metabolism and finds that there is a marked fall in the total nitrogen excretion on the day after etherization, and a considerable rise on the two subsequent days; that there is a general tendency for the urea excretion to fall on the day after etherization, to rise on the second day above, and on the fourth day to fall far below, its percentage on the first day; that the excretion of uric acid rises after anesthesia, the maximum output being reached on the day following the operation, and that the total amount and percentage of xanthin bodies vary inversely as the urea. The marked fall in the secretion of urea on the fourth day, in the face of the doubled output of total nitrogen and low percentage excretion of uric acid, points, according to the author, to a profound change in the composition of the urine, in virtue of which nitrogen tends more and more to be eliminated by other bodies than urea. A. Seelig¹ states that in his tests on dogs ether inhalation invariably caused glycosuria, but that the latter failed to develop when there was simultaneous intravenous infusion of oxygen.

Ethyl Bromid.—W. R. Huggard² calls attention to the value of ethyl bromid as a general anesthetic and as a preliminary to ether. According to the author, deaths from its use occurred chiefly some years ago, before the sources of danger were well understood, and no death has been reported since 1897. The rapid anesthesia, its short duration, the quick return to consciousness, and the absence of unpleasant effects are very striking. The amount to be given at a single dose is from 10 to 30 grams, and the drug must be pure. Decomposition is very liable to occur through exposure to light and air. Most of the deaths have been due to excessive dose or to impurity. It should be administered by means of a mask covered with impermeable cloth, so as to exclude the air. Unsuitable persons are young children and those suffering from anemia, Bright's disease, fatty degeneration, and alcoholism. One drawback to ethyl bromid anesthesia is that the muscles do not usually become relaxed. E. Marvel³ finds that the advantages of using ethyl bromid anesthesia as a preliminary to ether anesthesia are the shorter time required, the reduction of discomfort by the absence of bronchial irritation, the less excitement, the smaller amount of ether required, the more rapid regaining of consciousness, and the lessened tendency to postanesthetic vomiting. The author has employed the method in 33 cases, and 30 of these were celiotomies. O. E. Bloch⁴ also speaks favorably of ethyl bromid anesthesia in short operations. Kelly⁵ employs ethyl bromid anesthesia for short throat operations. Owing to the spasmotic closure of the jaws in ethyl bromid anesthesia, the author directs that a gag should always be placed between the teeth before administering the drug.

Ethyl Chlorid.—Burnet⁶ claims that for minor operations ethyl chlorid is an ideal anesthetic. Its action is rapid, and its administration safe and pleasant for the patient. It should be given concentrated, as when mixed with air it requires a much longer time to produce anesthesia.

¹ Centralbl. f. innere Med., xxiv, No. 8, 1903.

² Lancet, Sept. 5, 1903.

³ Ann. of Gyn. and Ped., Feb., 1903.

⁴ Therap. Gaz., Feb. 15, 1903.

⁵ Brit. Med. Jour., Aug. 30, 1902.

⁶ Med. Press and Circ., Dec. 10, 1902.

The author emphasizes the point that he did not obtain such complete muscular relaxation with ethyl chlorid as with chloroform. C. G. Cumstom¹ has used ethyl chlorid as a general anesthetic in 153 cases without the slightest accident and with much comfort to both the operator and patient. He especially recommends it as a preliminary to ether. Mac-Lennan,² from a limited experience with ethyl chlorid anesthesia, concluded that this method of anesthesia is as safe as that by nitrous oxid; that it is swifter in action; that, involving much less apparatus, it is more convenient; that it may be useful for rather a wider range of cases in consequence of the longer anesthesia procurable. H. Girard³ publishes an elaborate study of the action of ethyl chlorid both upon man and upon animals, and draws conclusions most favorable to the use of this anesthetic. The report of his clinical experience, however, does not seem to justify his conclusions. Of 78 cases there was a failure to produce anesthesia in 4, and in 19 cases the preanesthetic period ranged from 5 to 28 minutes. In the majority of cases the anesthetic period was not continued more than 10 minutes; the pupils were dilated in 85 % of the cases. The corneal reflex was absent in 49 %. Excitation was noted in 67 %, and was at times violent. Contractures were noted in 16 cases, and 4 were extremely violent. In 14 cases there was arrest of respiration, lasting in some cases 15 seconds. There was vomiting in 39 % of the cases, sweating in 26 %, and increased rapidity of the pulse almost invariably, running even to 160 a minute. The urine was examined in only 7 cases, but all of these showed albumin after inhalation, which did not always disappear in 24 hours. Lepage and Le Lorier⁴ recommend the employment of ethyl chlorid as a general anesthetic in parturition, when the pain is not sufficiently severe to warrant the use of ether or chloroform. F. O. Allen⁵ reports a death during general anesthesia with ethyl chlorid. The patient, who was 28 years of age, was an epileptic and suffered from an incarcerated inguinal hernia. M. W. Ware⁶ has collected 12,436 cases of general anesthesia with ethyl chlorid, with one death, and W. J. McCardie⁷ mentions 16,000 cases, collected by Seitz, with one death.

Ethyl Iodid.—Amat⁸ reports 2 cases of whooping-cough of a severe type in which inhalations of ethyl iodid had a very happy effect.

Eucain B.—Marcinowski⁹ maintains that this drug is in every respect superior to cocaine except in iritic processes; that it is at least 3.75 times less toxic than cocaine; and that it has special advantages in ophthalmic work, in that it causes only slight vascular dilation, does not influence the pupil or accommodation, and does not alter ocular tension or affect the cornea.

Formalin.—In January, 1903, C. C. Barrows¹⁰ reported a case of severe streptococcus infection in which he had used two intravenous infusions of

¹ Boston M. and S. Jour., Jan. 1, 1903.

² Glasgow Med. Jour., Oct., 1902.

³ Rev. de Chir., Nov. 10, 1902.

⁴ Bull. Gén. de Théráp., vol. cxliv, No. 17, 1902.

⁵ Am. Jour. Med. Sci., Dec., 1903.

⁶ Jour. Am. Med. Assoc., Nov. 8, 1902.

⁷ Lancet, April 4, 1903.

⁸ La Méd. Moderne, vol. xiii, No. 37, 1902.

⁹ Deut. Zeit. f. Chir., Oct., 1902.

¹⁰ N. Y. Med. Jour., Jan. 31, 1903.

500 cc. and 750 cc. of a 1:500 aqueous solution of formalin, and which ended in recovery. This case excited wide comment, especially in the daily press. Sufficient testimony, both clinical and experimental, however, has already accumulated to show that this method of treatment is not only useless, but is not altogether free from danger. E. Waitzfelder¹ reports a case of septicemia in which injections of formalin were followed by a fall of temperature, but as the same effect was secured by normal salt solution, he attributes the result to the entrance of a quantity of watery fluid into the general circulation and not to the germicidal action of the formalin. One injection of double strength (1:2500) caused collapse, necessitating the use of restoratives. W. L. Bauer² reports a fatal case of streptococcus infection following traumatism, in which formalin injections were used without effect. Fortescue-Brickdale³ has found that chinosol and formaldehyd in large doses so depress rabbits infected with the pneumococcus that they die sooner than untreated animals. He concludes that there is no experimental evidence warranting the assumption that the course of septicemia in man can be influenced favorably by the intravenous injection of antiseptic substances, and that the only result to be obtained by pressing such treatment beyond the maximum nontoxic dose is to hasten the death of the animal. W. Park and W. Payne⁴ draw similar conclusions from their studies of the action of formalin injections in septicemic rabbits. [The early enthusiasm for the intravenous injection of formalin solutions seems to have subsided.]

W. G. Shalleross⁵ reports favorable effects upon the cough, secretions, temperature, and sweats in phthisis from inhalations of formaldehyd. He recommends equal parts of formalin (40 % formaldehyd) and 95 % alcohol. Chloroform, creasote, guaiacol, may be added, if desired. He describes an inhaler of a simple construction, which appears to have special advantages. Velyamovitch⁶ calls attention to the value of formalin in hyperhidrosis. He recommends a 25 % solution for the feet and a very weak solution (5 to 7 drops to half a glass of water) for the axilla. In sweats of phthisis he uses a still weaker solution. He also recommends undiluted formalin for cauterizing infected wounds.

A. F. M. Powell⁷ reports several cases of inoperable cancer in which local applications of formalin were followed by excellent results, the malignant mass being completely removed in from 10 to 24 days. The method is as follows: Absorbent lint soaked in formalin solution (1 part of commercial formalin to 19 of water) is laid upon the tumor; this is covered with jaconet and cotton-wool and bandaged on. The dressing is changed six-hourly. The method is said to be practically painless.

Fortoin.—This is a tasteless compound of formaldehyd and cotoin, insoluble in water and in acidulated fluids, but soluble in alkaline liquids. Bajanezkowski⁸ has employed it with success in 20 cases of diarrhea.

¹ Merck's Archives, Feb., 1903.

² Lancet, Jan. 10, 1903.

³ Phila. Med. Jour., Dec. 13, 1902.

⁴ Brit. Med. Jour., May 30, 1903.

⁵ N. Y. Med. Jour., March 21, 1903.

⁶ Med. News, April 4, 1903.

⁷ Medizinskoi Obozernil, lvii, No. 9, 1903.

⁸ Deut. Aerztebg., No. 1, 1903.

giving from 3 to $7\frac{1}{2}$ grains 3 times daily. [This is useful chiefly in fermentative intestinal conditions and merits more extended use.]

Fluoroform.—Stepp¹ reports in detail 14 cases of whooping-cough treated with fluoroform (1 or 2 teaspoonfuls hourly). The author claims that the drug has a specific influence. The duration of the disease from the beginning of the treatment varied from 11 to 28 days. Fluoroform is said to be tasteless, odorless, and nontoxic.

Gelatin.—Zuppinger² urges a trial of subcutaneous injections of gelatin in bleeding occurring in hemophilic children, in scurvy, in purpura hemorrhagica, and in melena neonatorum. He gives details of 5 cases of his own in which gelatin proved successful and emphasizes the necessity of using a pure, untainted gelatin obtained from recently killed healthy calves, and making sure the solutions are perfectly sterile. Margoniner and Hirsch³ have had excellent results from injections of gelatin in hemorrhage, especially in prolonged cases of hemoptysis. They dissolve 2 grams of gelatin in 100 cc. of warm normal salt solution and then expose the flask for one hour to live steam at 100° C. Oswald⁴ reports 15 cases of melena neonatorum occurring in the Woman's Hospital at Basel. Four of these cases recovered. Of the latter, 2 were treated with gelatin and 2 were not. He asks if the 2 cases which were treated with gelatin might not have recovered on the same treatment which the other two received. H. Tickell⁵ reports 5 cases of hemoptysis in which he used with success rectal injections of gelatin. In contradistinction to the hypodermatic injection, the rectal is said to be painless, to be free from the danger of infection, and not to cause rise of temperature. The solution is prepared as follows: $1\frac{1}{2}$ ounces of gelatin are dissolved in $2\frac{1}{2}$ pints of boiling water, and boiled very gently for 1 hour, when the volume will have been reduced to about 1 quart. The solution is then cooled to the body-temperature, and $\frac{1}{2}$ pint slowly passed into the rectum from an ordinary irrigator. The injection is given 3 times a day until the sputum shows no traces of blood. I. A. Abt⁶ observed prostration and collapse in 3 healthy children to whom he administered subcutaneously gelatin solution, carefully prepared and sterilized. In 2 cases the amount injected was 2 ounces of a 2 % solution; in the third case, a boy aged 9 years, the amount used was 3 ounces of a 2 % solution. He concludes from this experience and from experimental studies on rabbits that sterilized gelatin injected subcutaneously contains toxic products; that these are probably ptomaines; that no further proof is needed that gelatin causes more rapid coagulation of the blood when it is exposed to the air; that it would be difficult to state what a safe dose of gelatin should be given subcutaneously to a newborn infant; that the local use of gelatin and the use of gelatin by the mouth are to be warmly recommended and no objection can be urged against its use.

Dieulafoy⁷ reports a case in which a fatal attack of tetanus followed

¹ Prag. med. Woch., April 2, 1903.

² Wien, klin. Woch., No. 52, 1902.

³ Therap. Monats., Heft 7, S. 334, 1902.

⁴ Münch. med. Woch., Nov., 1902.

⁵ Lancet, Feb. 28, 1903.

⁶ Jour. Am. Med. Assoc., Jan. 31, 1903.

⁷ Bull. de l'Acad. de Méd., No. 19, 1903.

an injection of gelatin in a phthisieal woman, aged 38 years. The author points out that this is not an exceptional instance, as no less than 23 such cases have been recorded in the course of the past 2 years. Eigenbrodt¹ also reports a fatal case of tetanus from the injection of gelatin in a young girl of 18.

G. Rankin² reports 4 cases of aortic aneurysm, 3 thoracic and 1 abdominal, in which injections of gelatin (100 cc. of a 2 % solution) were followed by decided and probably permanent improvement.

R. Romme³ has found gelatin very useful in the treatment of infantile diarrhea. About 15 grains of gelatin, in solution, thoroughly sterilized, are administered at each feeding in the milk. In this way a daily dose of from 1½ to 2 drams of pure gelatin is taken.

Glycogen.—J. De Nittis⁴ claims to have obtained excellent results from the administration of this substance in tuberculosis, typhoid fever, influenza, and pneumonia.

Guaiacol.—J. J. Ridge⁵ reports favorable results in smallpox from inunctions (every 4 hours) of guaiacol dissolved in olive oil (1 part to 80). This treatment is said to have allayed itching, lowered temperature, and checked maturation. Of 102 cases treated, 9 died. Five of the fatal cases were in unvaccinated children.

Hay-fever Antitoxin.—W. P. Dunbar⁶ states that he has succeeded, by injecting the pollen of rye and other grasses into various animals, in producing an antitoxin which, when applied to the eyes and nostrils of hay-fever patients in whom the local symptoms of hay-fever have been artificially produced by the previous injection of a toxin isolated from the pollen of certain grasses, immediately quells the subjective symptoms. Felix Semon,⁷ from a limited clinical experience with Dunbar's antitoxin, concludes that it gives relief in some cases, and appears to act beneficially in postponing the occurrence of attacks in other cases. In two of his patients, Semon adds, it had the effect of making the hay-fever period a good deal more tolerable than on previous occasions. Emil Mayer⁸ has found Dunbar's antitoxin distinctly curative in the forms of hay-fever that occur in the early summer months, but finds that it fails in the autumnal forms. [The experience thus far recorded is in the main favorable to further experimentation.]

Hedonal.—This is the ester of methyl-propyl-carbinol-carbamic acid. It is a white, crystalline powder, almost insoluble in cold water, but soluble in hot water and in alcohol, having a mint-like odor and peculiar unpleasant taste. P. S. Lampsakow⁹ from an experimental study of hedonal concludes that it is an active and safe hypnotic; that it is four times as active as urethane; that it does not disturb the heart or respiration; that in cases in which there is a weak circulation it is less dangerous than chloral. F. L. Hills¹⁰ from a considerable experience with hedonal

¹ Gaz. heb. de Méd. et de Chir., Oct. 16, 1902. ² Brit. Med. Jour., June 27, 1903.

³ Presse Méd., Sept. 5, 1903.

⁵ Brit. Med. Jour., May 30, 1903.

⁷ Brit. Med. Jour., July 18, 1903.

⁹ Neurol. Centralbl., Jan. 16, 1903.

⁴ Arch. Gén. de Méd., May 19, 1903.

⁶ Deut. med. Woch., No. 9, 1903.

⁸ N. Y. Med. Jour., Aug. 8, 1903.

¹⁰ Therap. Gaz., March 15, 1903.

in insane subjects states that it has a hypnotic value rather greater than that of sulfonal, not so long continued as that of paraldehyd or chloral, but safer in its action than any of these; that it appears free from any ill effects, and is capable of inducing from 4 to 8 hours of quiet sleep, from which the patient awakes refreshed; that its action is manifest in from $\frac{1}{2}$ to 1 hour after administration; and that it is most effective in doses of from 20 to 30 grains, in dry powder or in capsules. J. T. Martinson¹ also reports favorably upon the action of hedonal as a hypnotic.

Helmitol.—This is said to be a methylene citronate of urotropin, and to have an advantage over the latter in readily liberating formaldehyd in alkaline urine. Goldsehmidt² has found helmitol, in doses of 15 grains 2 or 3 times a day, of great value in a large series of cases of cystitis and prostatitis in which the urine showed a tendency to alkaline decomposition.

Heroin.—J. de la Jarrige³ cites an instance of addiction to heroin in a woman, aged 46 years, to whom the drug had been given nightly in doses of $\frac{1}{16}$ grain hypodermatically for 2 months. The subsequent abuse of the drug led to delirium, painful cramps, and great nervous agitation. Recovery rapidly followed the abrupt withdrawal of the drug. A. Strauss⁴ has obtained good results in some cases from the use of heroin as an anaphrodisiac.

Hydrogen Dioxid.—A. H. Fridenberg⁵ reports a case of mercurial stomatitis which proved rebellious to the usual remedies, but which quickly yielded to the use of a mouth-wash of hydrogen dioxid (1 to 3) every half-hour. [We would add to this another instance of the successful use of this remedy under similar conditions.]

Hyoscin.—H. C. Wood, Jr.,⁶ claims that there are two solanaceous alkaloids similar in their physiologic effects, and yet different enough to allow distinction, which have been known under the names of hyoscin and scopolamin, and that the present hyoscin of commerce is in reality scopolamin. He holds that the differences in the conclusions of Clausen and of Wood, who found that hyoscin slowed the pulse and depressed the respiration, and those of Kobert, who found that the drug acted on the pulse as did atropin and had no effect on the respiration, are due to the fact that these observers were working with different substances.

The hyoscin treatment of the morphin habit, originated by Lott and advocated by Hare, has proved perfectly satisfactory in S. O. Goldan's⁷ hands. It consists in frequent hypodermatic injections of hyoscin, beginning with $\frac{1}{200}$ grain and gradually increasing the dose and frequency of administration so as to keep the patient completely under the influence of the drug for 2 days or more. The treatment requires a darkened room, isolation of the patient, the constant attendance of a nurse, and feeding by enemas. R. Rosenberger⁸ reports an instance in which a patient who often took as much as 60 grains of morphin a day was

¹ Virginia Med. Semi-Monthly, April 24, 1903.

² Therap. Monats., No. xvii, 1903.

⁴ Münch. med. Woch., Sept. 9, 1902.

⁶ Jour. Am. Med. Assoc., Feb. 21, 1903.

⁷ N. Y. Med. Jour., Jan. 3, 1903.

³ Thèse de Paris, 1902.

⁵ Amer. Med., Jan. 24, 1903.

⁸ Med. News, Nov. 29, 1903.

seemingly entirely cured by the hyoscin treatment, in that 11 months have elapsed without any return to the habit. Russell¹ also reports a similar case in which the hyoscin treatment proved successful. G. E. Petty² reports several cases illustrating the marked susceptibility of some persons to hyoscin and indicating that the routine or careless administration of the drug in morphin habitués is an exceedingly hazardous procedure. T. Crothers³ believes that hyoscin is a dangerous drug in morphinism, and states that several cases have come under his observation in which, while it was impossible to say that the drug caused death, there were reasons for believing that it was an active factor in the final collapse. J. B. Mattison⁴ holds that the hyoscin treatment of morphinism is irrational, unscientific, inhumane, and dangerous.

Ichthargan.—H. C. Wood, Jr.,⁵ has studied the physiologic action of ichthargan, or silver sulfo-ichthyolate, and finds that it is precipitated by the ordinary reagents for silver and by the salts of hydrochloric acid, thus demonstrating that it is undoubtedly broken up in the stomach into silver and ichthyol. Its action, according to the author, seems to be precisely similar qualitatively to that of the other silver salts, but it has the advantage over the nitrate in that it is locally less irritant and is decidedly less poisonous.

Ichthyol.—J. S. Kolbassenke⁶ has used ichthyol since 1896 in the treatment of smallpox. The results, the author asserts, have been good. He employs an ointment composed of 1 part of ichthyol and 1 part of vaselin. Williams,⁷ from an extended experience with the use of ichthyol in tuberculosis, concludes that it is the most satisfactory remedy we possess. He gradually increases the dose from 10 minims thrice daily to 50 or 60 minims thrice daily. In tuberculous laryngitis with ulceration his favorite method of treatment is to curet and then apply pure ichthyol, the parts being first thoroughly anesthetized.

Iodin.—T. W. Williams⁸ calls attention to the value of glycerol of iodin, and to its superiority when compared with the ordinary tincture. As glycerin is a perfect solvent of iodin and less volatile than alcohol, this preparation cannot be used as freely as the tincture. The author has used glycerol of iodin with good results in chronic pleurisy, adenitis, chronic bronchitis, and goiter. Catillon⁹ also speaks favorably of the glycerol of iodin. He states that glycerin favors the absorption of iodin, and that the glycerol should be preferred to the tincture when it is necessary to act on the deeper tissues, or when a mild and prolonged action is desired.

Iodipin.—This is an addition product of iodin (10 % or 25 %) with oil of sesame. R. Thaussig¹⁰ has found iodipin an efficient substitute for iodin, equally potent and free from toxicity. He has used it with good results in arteriosclerosis, asthma, syphilitic endarteritis, chronic plumbism,

¹ Med. Rec., Nov. 29, 1902.

² Med. News, Oct. 18, 1902.

³ Med. News, Oct. 18, 1902.

⁴ Med. News, Oct. 18, 1902.

⁵ N. Y. Med. Jour., April 11, 1903.

⁶ Die Heilkunde, May, 1903.

⁷ Jour. of Tuberc., Oct., 1902.

⁸ Amer. Med., April 11, 1903.

⁹ Bull. Gén. de Théráp., vol. cxlv, No. 2, 1903.

¹⁰ Wien. med. Woch., 1902, No. 29.

administering the 25 % preparation (5 drams) hypodermatically every fourth day. J. Möller¹ reports that he uses iodipin in preference to the ordinary iodids when he wishes to obtain a prompt and harmless iodin action. He finds that it does not derange digestion and that it very rarely causes iodism. P. Torretta,² E. Hönigschnied,³ and E. Feibes⁴ also report favorably upon iodipin as a substitute for the iodids. J. A. Shaw-Mackenzie⁵ reports 2 cases of uterine fibroid in which marked reduction in the size of the growths resulted from the administration. In the second case, in which the improvement was most decided, 2 cc. of iodipin (25 %) were injected daily into the cellular tissue of the buttocks, the amount being gradually increased, and the treatment continued for 2 months.

Iodothyroin.—E. Roos⁶ has tried the effect of iodothyroin (15 grains once or twice daily) in a number of diseases. In cases of goiter he succeeded in reducing the size of the gland in many instances. Cretinism was remarkably affected, except when the patients were adults. In arteriosclerosis he observed no benefit from iodothyroin. Obesity was often improved with moderate doses. Psoriasis yielded more readily to external treatment after a course of iodothyroin.

Ipecac.—This drug is discussed by R. Kobert,⁷ who distinguishes two genuine varieties, producing 3 alkaloids: emetin, cephalin, and psychotin. The last is present in only small quantities, is slightly poisonous, and of not much therapeutic importance. The other two are irritating to the skin and mucous membranes, yet when injected do not cause necrosis or abscess, being absorbed too rapidly, but exert deleterious effects upon the heart, gastrointestinal tract, and kidneys. Emetin is the better expectorant; cephalin the preferable emetic. Since Carthagenae ipecac contains twice as much cephalin as the Rio drug, it is the superior emetic. C. Lowin⁸ finds that the toxicologic effects of emetin and cephalin are quite similar, both being active irritants to mucous membranes, both being cardiac poisons; emetin, however, affecting the heart in much smaller dose than cephalin. Both alkaloids, the author finds, produce emesis, but whereas cephalin is active in this respect, emetin hardly deserves the name, and is much more active as an expectorant. Different specimens contain very different proportions of the two alkaloids; that from Rio containing $\frac{1}{2}$ % of emetin and 25 % of cephalin, that from Carthagenae containing 40 % of emetin, and 56 % of cephalin. R. Wild⁹ has also studied the action of the ipecac alkaloids. As an expectorant he prefers emetin to cephalin, the latter having too powerful an emetic action and being rather unstable in solution. In the author's experience, a solution of emetin hydrobromid in 20 % alcohol containing 1 grain to each fluidounce proved very satisfactory. Of this he recommends as a dose 5 to 20 minims as an expectorant, and 1 to 3 drams as an emetic.

¹ Klin.-ther. Woch., x, No. 3, 1903.

² Prog. Medico, i, 18, 1903.

³ Central.-Zeitung, xiv, No. 36, 1902.

⁴ Dermat. Zeitschr., No. 9, 1902.

⁵ Lancet, April 4, 1903.

⁶ Münch. med. Woch., Sept. 30, 1902.

⁷ Therap. Monats., Aug., 1902.

⁸ Arch. Internat. de Pharm. et de Therap., vol. xi, fasc. 1 and 2, 1903.

⁹ Lancet, Sept. 6, 1902.

Iron.—Baumann¹ has performed a series of experiments in order to determine the relative effect of iron and arsenic on the recuperation of the blood after hemorrhage. A fourth of the total blood in the body was withdrawn from a series of dogs and carefully examined; subsequently some of the dogs were given iron, some arsenic, and some were given both iron and arsenic. In 4 animals no drug was given. At the end of a week the blood was reexamined. It was found that when iron in inorganic form was given the deterioration of the blood caused by the bleeding was considerably lessened, and that the hemoglobin was even increased above its original value. With the albuminate of iron, similar but less striking results were obtained. Arsenic alone produced little effect, while iron and arsenic together were found to give optimum results both as regards the number of corpuscles and solids of the plasma, while the proportion of hemoglobin was but little less than normal.

Lacnanthes Tinctoria.—J. Gardner, H. Spitta, and A. Latham have investigated the properties of this herb, which has been lauded as a specific for tuberculosis. They find that it consists chiefly of a resinous principle and a soluble body, which is precipitated by lead subacetate. Further, that so small a dose as a dram of an aqueous solution of an alcoholic extract is sufficiently powerful to kill guinea-pigs, while doses of from 12 to 35 minims do not exert any inhibitory influence upon the progress of tuberculosis, but rather seem to hasten it.

Lithium.—C. A. Good² draws the following conclusion from experimental studies of the lithium salts: Lithium is secreted in the saliva, into the stomach and bowel, and in the urine; chiefly in the latter. Lithium salts given hypodermatically or by the mouth cause sooner or later fatal gastroenteritis. This gastroenteritis is connected with the excretion of the metal through the bowel-wall. Lithium salts render the urine alkaline like other alkalies; they do not possess any diuretic action that cannot be accounted for by their salt action. Lithium carbonate in doses of from 15 to 20 grains has been known to cause gastrointestinal symptoms in man. Dilute solution of lithium are not solvents of uric acid or urates.

Lysoform.—F. Tunnicliffe and R. Hewlett³ describe lysoform as formicaldehyd soap. It is a colorless liquid, superficially similar to glycerin. Its irritating qualities render it valuable for skin disinfection. It is a rapid and powerful deodorizer. It can be used as a gargle or irrigating fluid for mucous cavities. Five per cent. solutions kill typhoid bacilli in from 10 to 20 minutes, and staphylococci in about an hour. Its toxicity is very low. Elsner⁴ finds that a mixture (carbo-lysoform) of crude carbolic acid and lysoform in the proportion of 1 of the former to 2 of the latter is as powerful a germicide in 3 % solution as a 3 % solution of pure phenol, and as powerful as a 10 % solution of pure lysoform.

¹ Jour. of Physiol., Feb., 1903.

² Med. Press and Circ., Oct. 29, 1902.

³ Am. Jour. Med. Sci., Feb., 1903.

⁴ Deut. med. Woch., July 17, 1902.

Magnesium Peroxid.—D. Frenkel¹ describes a preparation of magnesium peroxid known as hopogan. It contains 7.15 % of active oxygen, which corresponds to 25 % of magnesium peroxid. It is said to liberate nascent oxygen in the stomach.

Magnesium Sulfate.—W. T. Buchanan² states that he has notes of over 1130 cases of dysentery treated in India by the sulfates of magnesium or sodium, with only 9 deaths, and finds that there has not been a single death in the last 272 cases treated by him.

Mercurol.—H. Dreesman³ recommends mercurol, a combination of mercury and nucleinic acid, in leg ulcers, in the form of a 2 % to 5 % ointment; in soft chancre and granulating wounds as a dusting-powder; in gonorrhea as 0.5 % to 2 % injection; in syphilis internally in doses of $\frac{3}{4}$ to 1½ grains, twice daily.

Mercury Cyanid.—C. G. Cumston⁴ states that mercury cyanid (1:2000) is a powerful antiseptic; that it presents great advantages over other antiseptics now in vogue in that it does not attack instruments nor the epidermis nor coagulate albuminoids, while it is absorbed with difficulty by the tissues; and that it has been conclusively proved by clinical trial that its toxicity is no greater and in all probability far less than that of corrosive sublimate.

Mesotan.—This is the methyloxymethyl ester of salicylic acid. It occurs as a yellow liquid, almost odorless, and miscible with oils and other organic solvents. According to Theo. Floret,⁵ it is readily absorbed by the skin, and in a short time after its local application salicylic acid can be detected in the urine. Floret has used it with excellent results as a topical remedy in 120 cases of rheumatism. Only very rarely did it cause dermatitis. H. Roeder⁶ has used mesotan in 42 cases of rheumatism, and in only 2 cases did it fail to relieve. In 2 cases of neuritis it caused universal dermatitis. The preparation was applied with a brush and was not rubbed in. E. Reichmann⁷ and K. Liepelt⁸ also speak favorably of the action of mesotan in rheumatic affections. As pure mesotan was at times irritating, Reichmann usually employed it diluted with from 20 % to 30 % of castor oil.

Methylene-blue.—Moore and Allison⁹ conclude from a study of the action of this drug in malaria that it will destroy malarial parasites in many cases, but is less certain than quinin; that it is probably most useful in chronic cases, but has no advantage over quinin; that it is useful when quinin cannot be taken owing to idiosyncrasy; that it would probably be valuable in hematuric and hemoglobinuric fevers on account of its diuretic action; and that the effects of methylene-blue are ordinarily more unpleasant than those of quinin.

H. Herbert¹⁰ has used methylene-blue (½ to 3 grains thrice daily) in 20 cases of phthisis. He finds that it lessens cough and reduces the

¹ Le Progrès Méd., vol. xvii, 1903.

² Brit. Med. Jour., Sept. 20, 1902.

³ Münch. med. Woch., Feb. 3, 1903.

⁴ N. Y. Med. Jour., Sept. 26, 1903.

⁵ Deut. med. Woch., Oct. 16, 1902.

⁶ Münch. med. Woch., Dec. 16, 1902.

⁷ Therap. der Gegenwart, xliii, No. 12, 1902.

⁸ Berl. klin. Woch., April 20, 1903.

⁹ Med. News, Dec. 6, 1902.

¹⁰ Jour. of Tuberc., v, No. 1, 1903.

amount of expectoration, but that it frequently causes vomiting, stranguary, and a choking sensation—probably in consequence of impeding expectoration. Gaudier¹ speaks highly of the value of instillations of a warm solution of methylene-blue (1 : 500) in the treatment of chronic suppurative otitis media. F. Drenning² holds that methylene-blue is practically nonactive in gonorrhea and presents cases to prove his contention.

Morphin.—H. A. Hare³ publishes the answers received in reply to letters sent to well-known physicians asking for opinions as to the value of morphin in uremic convulsions. Replies are published from J. Tyson, W. Hale White, W. Ewart, F. Billings, J. H. Musser, and J. M. Anders. The general opinion seems to be that morphin is generally harmful, especially in chronic interstitial nephritis; that it is only in acute cases of parenchymatous nephritis that it may be of value, and then in small doses. Still there is some difference of opinion. Billings considers it a cardiovascular tonic and of great value in cases in which there is cardiac dilation with vasomotor stasis and a tendency to pulmonary edema. He would give strychnin with the morphin. Musser has found it of great service in uremic asthma, and in one or two cases of chronic nephritis he believes that it was of service in preventing a recurrence of convulsions.

Nitrohydrochloric Acid.—L. B. Lockard⁴ claims that this remedy (3 to 5 drops of undiluted acid after meals and on retiring) is almost a specific for hay-fever.

Olive Oil.—K. Walko,⁵ having obtained excellent results in the treatment of gastric hyperacidity with olive oil (3½ to 10½ ounces), has applied the treatment in 9 cases of gastric ulcer. He claims that the oil inhibits acid secretion, protects the ulcer, relieves constipation, resists decomposition, and promotes nutrition. The oil is given in ½-ounce doses, which are rapidly increased to 1½ ounces, thrice daily. When the patient objects to the oil, it is given in emulsion through a tube. While the symptoms usually abate within a week, it is recommended to continue the treatment for 3 weeks.

Phototherapy.—A. J. Harrison and W. K. Wills⁶ have employed Finsen's light treatment in 42 cases of lupus vulgaris. It was observed that the cases responded best that had never been severely dealt with. The authors summarized their result to date as follows: Improved and continuing under treatment, 26; relieved—to be kept under observation—5; relieved—in one or more parts, whereas other parts have to be treated—4; not improved, 1; unsatisfactory, through nonattendance, 2; cases under treatment for too short a time to judge of effect, 4.

Morris and Dore⁷ report as follows upon the value of the light treatment: Of 65 cases of lupus vulgaris, 11 have remained without relapse for periods varying from 6 months to 2 years; of 11 cases of lupus erythe-

¹ Rev. Men. des Mal. de l'Enf., March, 1903.

² Northwestern Lancet, Dec. 15, 1902. ³ Therap. Gaz., Jan. 16, 1903.

⁴ Boston M. and S. Jour., Jan. 15, 1903. ⁵ Centralbl. f. innere Med., Nov. 8, 1902.

⁶ Bristol Med.-Chir. Jour., March, 1903. ⁷ Practitioner, April, 1903.

matosus, great improvement occurred in 7; of 27 cases of rodent ulcer, favorable results were obtained in 12. Norman Walker¹ states that having observed that a patient with lupus erythematosus invariably improved after exposure to the glare from the water when fishing in the Highlands, it occurred to him to try the light without pressure or aiming at blistering effects. The patients with lupus erythematosus were therefore exposed to the rays while seated about a foot away from the lens. In some of the cases the results, according to the author, have been brilliantly successful. M. Leredde² states that light treatment of acne rosacea should be included among the recognized therapeutic measures; that it brings about a cure more rapidly than chemical means, and is more quickly efficacious than it is in either form of lupus.

Nils Finsen³ claims that unless an epidemic of smallpox is of an exceptionally fatal character, the death-rate may be reduced 50 % by the employment of the red-light treatment first advocated by him 10 years ago. If, however, he asserts, suppuration has begun, or is on the point of beginning, the red-light treatment will not stop it. J. F. Schamberg⁴ states that he does not believe in the efficacy of the red-light treatment of smallpox, and reports 2 cases of a confluent type in unvaccinated young men in which this treatment was employed after the third day of the eruption. One of these patients died and the other recovered with the most disfiguring scars. Nils Finsen,⁵ in a second paper, calls attention to the unfairness of Schamberg's test, pointing out that the two patients were unvaccinated, delirious men, with confluent smallpox, and were not subjected to the light treatment until the third day of eruption or about the seventh day of the disease. Krukenberg⁶ has employed the red light in 18 cases of erysipelas with good results. The efficacy of the treatment is attributed to the absence of chemical rays in the red light.

Physostigmin.—L. Moskowicz⁷ has found injections ($\frac{1}{64}$ to $\frac{1}{32}$ grain) of physostigmin salicylate very valuable in severe postoperative meteorism. He reports 5 cases illustrating the efficacy of the drug.

Picric Acid.—F. V. Milward⁸ states that the lesions in which picric acid is particularly useful are those in which the loss of superficial epithelium has produced a raw and painful sore, discharging serum or seropus. In these cases picric acid (1 part in 95 parts of distilled water) promotes rapid healing by forming a pellicle of coagulated albumin over the wound. In cases of perionychia, ingrowing toenail, and intertrigo, for example, picric acid acts exceedingly well. The acid must be applied very thoroughly, and renewed frequently until the coagulated lymph completely covers the sore. Its only drawback is the deep staining it produces, but it appears to cause no irritation to the tissues.

Piperidin Tartrate.—W. Bain⁹ concludes, from a study of the influence of some modern drugs on metabolism in gout, that piperidin tar-

¹ Scottish M. and S. Jour., June, 1903.

² Jour. des Praticiens, April 18, 1903.

³ Brit. Med. Jour., June 6, 1903.

⁴ Jour. Am. Med. Assoc., May 2, 1903.

⁵ Jour. Am. Med. Assoc., Nov. 14, 1903.

⁷ Wien. klin. Woch., No. 22, 1903.

⁶ Lyon Médical, vol. xcix, No. 42, 1902.

⁸ Brit. Med. Jour., Feb. 21, 1903.

⁹ Brit. Med. Jour., Jan. 31, 1903.

trate, piperazin, lysidin, and sidonal, in the order named, showed an increasingly augmenting effect on uric excretion, and that lithium benzoate and urotropin were ineffective.

Potassium Iodid.—R. Crocker¹ believes that the occurrence of iodid rashes after small doses of the drug may be due to failure of excretion by the kidneys and should lead to careful examination of the urine. Potassium iodid, he states, should not be given to persons suffering from acne rosacea, which is often aggravated by it, and bullous eruptions, such as pemphigus or dermatitis herpetiformis, may become much worse, and even hemorrhagic or gangrenous if the drug be used. Bjelogolowy² has observed iodism in 16 patients after the administration of small doses of potassium iodid. As marked gastric hyperacidity was present in these cases, he thinks it probable that the acid liberated the free iodin, which in its nascent form became more active. J. B. Cleland³ reports the case of a man, aged 59, apparently syphilitic, in whom a dose of 20 grains of potassium iodid was quickly followed by severe pains in the legs, the development of extensive purpura, and collapse, death resulting within 30 hours.

Potassium Permanganate.—J. Hall-Edwards⁴ reports gratifying results from the application of a solution of potassium permanganate (1 dram to 1 ounce of distilled water) in lupus vulgaris. After cleansing and drying the part the solution is applied with a brush. As an adjunct to α -ray treatment the author regards potassium permanganate as invaluable. E. Pearson⁵ has also used potassium permanganate with excellent result in a case of ulcerating lupus of the nose.

E. T. Martsinowski⁶ has successfully used a solution of potassium permanganate (enough of the drug to make a solution of a deep violet color) on lint in numerous cases of erysipelas. A. Khouri⁷ has given potassium permanganate in doses of from 1 to 5 grains in numerous cases of dysmenorrhea. W. Stephenson⁸ also speaks well of potassium permanganate in functional menstrual disorders.

Pyramidon.—Valentini⁹ finds this drug a useful antipyretic in typhoid fever. In most cases he gives from 5 to 8 grains night and day, every two hours.

Pyranum.—This is a soluble sodium salt of a combination of benzoic acid, thymol, and salicylic acid. E. Schlesinger¹⁰ has used it in 146 cases as an antirheumatic and analgesic. Its action is said to have been good. The dose is from 7 to 30 grains 2 or 3 times a day.

Quinin.—The experience of J. Michon¹¹ in Corsica is opposed to the teaching of Celli that quinin salts should not be used as prophylactic agents against malaria. He has found the hydrochlorid in doses of 11 grains every third day most effective in preventing the occurrence of

¹ Lancet, March 21, 1903.

² Vratch, No. 44, 1902.

³ Brit. Med. Jour., Epit., July 11, 1903.

⁴ Brit. Med. Jour., June 27, 1903.

⁵ Brit. Med. Jour., July 25, 1903.

⁶ Medizinskoi Obozeyrnii, lix, No. 5, 1903.

⁷ Jour. des Praticiens, Jan. 11, 1903.

⁸ Scottish M. and S. Jour., Jan. and Feb., 1903.

⁹ Deut. med. Woch., April 16, 1903.

¹⁰ Therap. Monats., Jan., 1903.

¹¹ Arch. Gén. de Méd., June 23, 1903.

infection even when the conditions were most favorable. He prefers the hydrochloride to the sulfate because it is more soluble and more easily absorbed, less irritating to the stomach, and contains a larger proportion of quinin. Aufrecht¹ recommends, as a convenient method of using quinin hypodermatically, combining it with urethane, whereby it is rendered more soluble. For one injection he prescribes: quinin hydrochlorid, $7\frac{1}{2}$ grains; urethane, $3\frac{3}{4}$ grains; and distilled water, 80 minims. J. Moore² asserts that as an antirheumatic the salicylate of quinin has few equals, and is surpassed only by sodium salicylate. In rheumatism associated with depression it may be substituted with advantage for sodium salicylate, and may be given in doses of 5 grains, thrice daily in cachets. The author also speaks favorably of the action of this drug in influenza, pneumonia, typhoid fever, and the various exanthematous diseases. Mariani³ claims to have cured 2 cases of inoperable uterine cancer by endovenous injections of quinin (Jaboulay's treatment). The dose was 4 grains gradually increased to 8 grains. Treatment extended over 3 months.

Radium.—Hallopeau and Godaud⁴ report a case of lupus of the hand much improved by radium. Danlos⁵ reports 4 cases treated in the same manner, and expresses the opinion that there is a great future for radium in dermatotherapy. F. Trémolières⁶ describes the method of using radium. The substance is applied in the form of a powder in a small celluloid or rubber bag containing a mixture of barium chlorid and radium chlorid. It is held in place over the lupus patch with a strip of gauze and left for from 6 hours to 5 days. The area ulcerates in from 1 to 3 weeks, and heals with a smooth supple scar in from 20 to 25 days. J. Macintyre⁷ reports 2 cases of lupus and one of rodent ulcer, in which marked benefit was obtained from applications of radium.

Silver.—Netter⁸ details at length 11 cases treated with endovenous injections of soluble silver (collargol) and inunctions of unguentum Credé, all of them recovering. The cases consisted of pneumonia, acute pericarditis, grave complicated searlatina, severe diphtheria, typhoid fever, and pyemia. In most cases, the author asserts, inunctions of Credé's ointment (30 to 45 grains at a séance) suffice, but when an immediate and vigorous effect is needed, recourse to intravenous injections (1 to 2 grams in 1 % or 2 % solution) should be taken. Dvoretsky,⁹ Thiroloix,¹⁰ and Schmidt¹¹ also report favorably upon intravenous injections of collargol.

Sodium Bicarbonate.—Lauder Brunton¹² calls attention to the analgesic properties of alkalies, and of sodium bicarbonate in particular. He finds that toothache may sometimes be stopped by putting into the cavity cotton soaked in a strong solution of sodium bicarbonate, and

¹ Therap. Monats., xvii, No. 2, 1903.

² Practitioner, Jan., 1903.

³ Il Policlinico Supplemento Settimanale, April 12, 1902.

⁵ Ibid.

⁴ Ann. de Dermat. et de Syph., No. 71, 1902.

⁷ Brit. Med. Jour., July 25, 1903.

⁶ Presse Méd., No. 100, 1902.

⁸ Bull. et Mem. de la Soc. méd. des Hôp., Nos. 37-38, 1902.

⁹ Vratch., Jan. 25 and Feb. 15, 1903.

¹⁰ Jour. des Praticiens, No. 3, 1903.

¹¹ Deut. med. Woch., April 9, 1903.

¹² Brit. Med. Jour., Oct. 18, 1902.

that the pain of boils may be relieved by the local application of such a solution.

Sodium Cinnamate.—A. Landerer¹ reiterates his belief in the efficacy of this drug in tuberculosis, and claims that under its administration a cure may be looked for in 90 % of mild cases, and that a cure takes place in at least 70 % of all cases. Krause² reports 21 cases of tuberculosis treated by intravenous injections of betol or sodium cinnamate. All of his patients were improved and many were apparently cured.

W. Robinson³ concludes from a very careful study of the literature and from his own impressions that sodium cinnamate is probably a useful adjuvant to other remedies in tuberculosis. Personally, however, he prefers creasote and its derivations. S. Cohen⁴ reports 14 cases of tuberculosis, the majority being mild, in which he employed intravenous injections of sodium cinnamate ($\frac{1}{2}$ to $\frac{1}{4}$ grain thrice weekly). He finds that none were cured, 1 was somewhat improved, 7 remained stationary, 5 were worse, and 1 died.

Sodium Glycocholate.—H. Richardson⁵ has found this bile salt (5 grains thrice daily) of service in chronic constipation, functional hepatic disorders, and in diabetes when it is necessary to use large quantities of fat. T. Keown⁶ has used sodium glycocholate with advantage in 2 cases of tuberculosis for the better absorption of fats. One patient gained 10½ pounds and the other 9 pounds in 3 weeks.

Sodium Phosphate.—R. Hutchison⁷ states that acid sodium phosphate, in doses of $\frac{1}{2}$ to 1 dram every 3 hours, has more effect in increasing the acidity of the urine than either mineral or organic acids. He has found the drug very useful in cystitis and in keeping the urine acid after operations on the bladder.

Somnoform.—This is a mechanical mixture of ethyl chlorid, 60 %, methyl chlorid, 35 %, and ethyl bromid, 5 %. S. W. Cole⁸ concludes from a study of the physiologic action of this compound that the chief danger from its use is paralysis of respiration; that owing to the comparatively slight action of the drug on the heart itself and its depressant action on the peripheral endings of the vagi, there is no danger of heart-failure, provided respiration has not ceased; and that after cessation of respiratory movements it is easy to restore the animal by artificial respiration. W. F. Cross⁹ read a paper on this anesthetic at the April meeting of the Society of Anesthetists, London. He stated that it had advantages over nitrous oxid in short operations in that the anesthesia was longer and in that there was neither jactitation nor cyanosis. The disadvantages were incomplete muscular relaxation, the tendency to postanesthetic vomiting, the possibility of serious collapse, and the liability of the compound to undergo decomposition with the formation of free bromin. In the discussion which followed the consensus of

¹ Jour. of Tuberc., Jan. 1, 1903.

² Berl. klin. Woch., Oct. 20, 1902.

³ Merck's Archives, Dec., 1902.

⁴ Berl. klin. Woch., March 30, 1903.

⁵ Med. Rec., Jan. 31, 1903.

⁶ Jour. Am. Med. Assoc., Aug. 16, 1902.

⁷ Brit. Med. Jour., Feb. 28, 1903.

⁸ Brit. Med. Jour., June 20, 1903.

⁹ Brit. Med. Jour., April 25, 1903.

opinion was that somnoform was inferior to the anesthetics in general use.

Strychnin.—R. G. Curtin¹ states that he is strongly opposed to the use of strychnin in large doses ($\frac{1}{3}$ grain or more in the 24 hours) in chronic heart-disease, and that he has never seen a case of marked depression of the heart from chronic disease in an elderly person in which large doses of strychnin were given and the patient survived. He holds that it is a pure stimulant, and does remove the cause of the symptoms, and that alcohol and digitalis are distinctly preferable. C. S. Potts² reports 2 cases of *tie douloureux* in which massive doses of strychnin ($\frac{1}{30}$ of grain daily hypodermatically gradually increased to $\frac{1}{8}$ grain) were used in conjunction with full doses of iron, absolute rest in bed, and large amounts of liquid food. Permanent recovery followed in the first case and temporary improvement in the second case.

Sublamin.—This is a compound of mercury sulfate and ethylenediamin, containing 43 % of mercury. It is very soluble and does not coagulate albuminoids. F. Mendel³ and M. Friedländer⁴ speak favorably of intramuscular injections of sublamin in syphilis. The former recommends from 2 to 6 drams of a 1 % solution of the drug in normal salt solution. M. Blumberg⁵ and A. Schuftan⁶ are of the opinion that sublamin is superior to corrosive sublimate for hand disinfection. Dahlberg⁷ recommends sublamin as a disinfectant in the following solutions: for the hands, 1 : 1000; for the external genitals, 1 : 1000; for instruments, 1 : 1000; for vaginal douches, 1 : 2000. [A recent epidemic of ringworm in a large institution showed conclusively the value of this substance.]

Sulfur.—J. Woroschilsky⁸ has used sulfur (15 to 18 grains every 2 hours) in a large number of cases of typhoid fever with gratifying results. He believes that it acts as a protective, antiseptic, and antiphlogistic. T. Weisenburg⁹ testifies to the value of sulfur in tropic dysentery. L. Kharitonov¹⁰ finds that sulfur makes an excellent substitute for iodoform in the treatment of wounds and ulcers.

Sulfuric Acid.—Leo¹¹ reports excellent results from the internal administration of sulfuric acid in cases of general pruritus. He cites 3 cases in which this treatment proved effective, even though the urine was not alkaline.

Tetanus Antitoxin.—F. A. Packard and R. Willson¹² have collected from literature 1216 cases of tetanus treated with antitoxin. Of these, 702 ended in recovery and 514 ended fatally, a mortality of 42.2 %. Of 67 cases not treated with antitoxin, 49 ended fatally, a mortality of 73.1 %. The authors conclude that antitoxin treatment has reduced the general mortality from 80 % to from 40 % to 50 %; of acute tetanus from 90 % to 80 %; and of chronic tetanus from 40 % to 20 %.

¹ Therap. Gaz., Nov. 15, 1902.

² Univ. of Penna. Med. Bull., April, 1903.

³ Therap. Monats., April, 1903.

⁴ Münch. med. Woch., Sept. 16, 1902.

⁵ Therapist, March 14, 1903.

⁶ Phila. Med. Jour., March 14, 1903.

⁷ Therap. Monats., Nov., 1902.

⁸ Deut. Aerzte-Zeitung, Feb. 15, 1903.

⁹ Inaug. Address, Berlin Univ., 1902.

¹⁰ Therap. Monats., Nov., 1902.

¹¹ La Semaine Méd., Sept. 17, 1902.

¹² Am. Jour. Med. Sci., Dec., 1902.

Vallas¹ (Lyons) has collected 373 cases of tetanus treated with antitoxin, with the following results: Total mortality 39 %. Incubation of 10 days: 141 cases, mortality 57 %; incubation of more than 10 days, 118 cases, mortality 20 %; incubation not determined, 114 cases, mortality 36 %. W. H. Luckett² reports 2 cases of acute tetanus, in which the incubation period was respectively 7 and 5 days, which ended in recovery, the treatment consisting in daily subarachnoid spinal injections (2 to 4 drams) of antitetanic serum. In contrast with these cases, a third is cited, in which the incubation period was 6 days, and which proved fatal under the ordinary symptomatic treatment. Wynter³ reports a case of severe tetanus (incubation, 10 days) which ended in recovery under the administration of morphin, extract of physostigma, and antitetanic serum—10 cc. every 6 hours for 60 doses. Von Schuckmann⁴ reports a fatal case of tetanus (incubation, 10 days) in which the antitoxin treatment was used without noticeable results. He believes that tetanus antitoxin in its present form is not likely to have any notable effect upon the course of the disease.

Descoss and Barthelemy,⁵ in experimenting on rabbits with a strong tetanus antitoxin, find that the preventive dose given 24 hours before injection of tetanus toxin is equally efficacious whether injected intraperitoneally, intracranially, intradurally, subcutaneously, or intravenously. When the antitoxin is given 24 hours after the toxin, the intraperitoneal injection is worthless, and the intravenous injections are by far the best. In the period of full tetanus, 48 hours after the injection of toxins, the subdural method alone will save.

Thallium Sulfate.—W. Bullard⁶ reports a case of poisoning in a man, aged 27, from the administration of 3 or 4 doses of $\frac{1}{2}$ grain each of thallium sulfate. The symptoms were those of multiple neuritis. Total loss of hair subsequently followed. Recovery eventually occurred. [Alopecia was observed in 8 of 34 cases in which Vossaix employed thallium acetate as an antihidrotic.]

Theobromin.—H. Huchard⁷ considers this drug one of the best diuretics that we have. He states that it does not affect the heart; it only slightly influences arterial tension; but it acts chiefly as a stimulant to the renal epithelium. He prefers it to diuretin and to agurin, and prescribes it in capsules in the dose of 7 grains daily.

Theocin.—This is an alkaloid prepared synthetically from acetic acid. Like theobromin, it is dimethyl xanthin, and differs only from theobromin in the position of the methyl groups. It is said to have little action on the heart or bloodvessels, but to act as a diuretic by stimulating the renal epithelium. The dose is from 3 to 8 grains, well diluted, after meals. O. Minkowski⁸ has used theocin in 14 cases, mostly cardiac and renal affections with edema. He has found it supe-

¹ Jour. Am. Med. Assoc., Jan. 3, 1903.

² Med. News, April 18, 1903.

³ Lancet, Nov. 15, 1902.

⁴ Deut. med. Woch., March 5, 1903.

⁵ Jour. de Physiol. et Path. Gén., vol. iv, No. 5, 1902.

⁶ Boston M. and S. Jour., Nov. 27, 1902.

⁷ Jour. des Praticiens, No. 9, 1903.

⁸ Therap. der Gegenwart, iv, No. 11, 1902.

rior to theobromin, in being more powerful and prompt in its diuretic action. In several cases, however, it caused nausea or vomiting. Chevalier¹ also speaks well of theocin as a diuretic.

Thiocol.—A. Von Weissmayr,² M. Chartier,³ C. Fuchs,⁴ Morin,⁵ and L. Friedmann⁶ all speak favorably of thiocol (guaiacol sulfonate of potassium) in tuberculosis. M. Elberson⁷ has used it with good results in 11 cases of croupous pneumonia. [The only advantage of thiocol over other preparations of guaiacol is its solubility. The question also arises as to the efficiency of the sulfonates as remedial agents.]

Thiosinamin.—This is a compound produced by acting on the volatile oil of mustard with ammonia. The reputed action ascribed to it is the softening of scar tissue. Hebra, Unna, Crocker, and others have recommended it in keloid, postlupus scarring, cicatricial strictures, etc. T. Teky⁸ reports 5 cases of esophageal stenosis in which thiosinamin injections were used. In 4 very good results were obtained; the third, of recent origin, grew worse. The author concludes that the remedy is of service only in old stenoses; in recent cases it loosens up and thickens the scar tissue, and thus aggravates the difficulty. E. Glas⁹ reports 6 cases of rhinoscleroma in which thiosinamin proved a very useful adjuvant to mechanical treatment. L. S. Somers¹⁰ reports 12 cases of chronic otitis media in which thiosinamin ($\frac{1}{2}$ to 1 gr. thrice daily) proved of service.

Thyroid Extract.—E. M. Payne¹¹ reports 5 cases of goiter, one with acute myxedema, which showed decided improvement under the influence of thyroid extract. Mörl¹² reports a case of myxedema dating from infancy in a woman, aged 37, in which thyroid extract was not only ineffective, but apparently hastened death. The author concludes that the drug is valueless in long-standing cases. Garand and Galland¹³ report a case in which thyroid medication caused almost total disappearance of a number of long-standing lipomas in a woman aged 48. E. Fuller¹⁴ reports 2 cases of obstinate bleeding in hemophiliacs arrested by the administration of thyroid extract. Gilbert and Herrscher¹⁵ have found thyroid extract of great value in relieving the severe itching attending jaundice from obstruction of the bile-ducks. According to R. Crocker,¹⁶ thyroid extract sometimes acts like a charm in the late stages of psoriasis, and in lupus vulgaris it has a more beneficial effect than any other internal medication. Nicholson¹⁷ states that in threatening eclampsia during pregnancy no remedy is so useful as thyroid extract, pushed until it produces its full effects upon the circulation.

Tin.—I. Dortschewsky¹⁸ finds that galvanically precipitated tin (9

¹ Rev. de Thérap., vol. lxx, 1903. ² Klin. therap. Woch., Nos. 8 and 9, 1902.

³ Merck's Archives, May, 1903. ⁴ Wien. klin. Rundschau, No. 22, 1902.

⁵ Rev. internat. de la Tuberc., No. 7, 1902.

⁶ Prag. med. Woch., April 9, 1903. ⁷ Aerztl. Central.-Zeitung, No. 8, 1902.

⁸ Klin. therap. Woch., ix, No. 45, 1902. ⁹ Wien. klin. Woch., March 12, 1903.

¹⁰ Merck's Archives, Nov., 1902. ¹¹ Brit. Med. Jour., March 21, 1903.

¹² Prag. med. Woch., Oct. 16, 1902.

¹³ Bull. Gén. de Thérap., vol. exliv, No. 14, 1902. ¹⁴ Med. News, Feb. 28, 1903.

¹⁵ Compt. Rend. d. Soc. de Biol., Aug., 1902. ¹⁶ Therap. Gaz., May 15, 1903.

¹⁷ Scottish M. and S. Jour., March, 1903. ¹⁸ Mediz. Obozyernil, No. 24, 1902.

grains every 15 minutes until 5 or 6 doses have been taken) is an excellent vermicide against tapeworm. Of 38 cases thus treated, the worm was expelled the first time in 26; in 7 instances treatment had to be repeated; but in 5 cases, after repeated treatment, the tenia was not expelled. The author believes that teniafuge effect of tin may be due to chemical action within the bowel, which affects the parasite but not the patient.

Trional.—J. Alksue¹ reports the case of a physician who swallowed nearly an ounce of trional and who slept 4 days in consequence. Recovery followed under repeated hypodermatic injections of strychnin. The symptoms were: cyanosis, contraction of the pupils, a low-tension pulse, and hematoporphyrinuria. F. Wightwick and H. Rolleston² report the case of a woman, aged 29 years, who took 125 grains of trional at a single dose. The chief symptoms were stupor, a very weak pulse, and abolition of reflexes. The urine appeared quite normal. Recovery followed under lavage and the administration of strychnin. [Hematoporphyrinuria is by no means so infrequent in chronic trional-taking as is supposed. We have personal knowledge of 8 instances. Physicians should frequently examine the urine for this sign.]

Truneeck's Serum.—This is a solution of inorganic salts devised by Truneeck for the treatment of symptoms caused by arteriosclerosis. The formula is: sodium chlorid, 75 grains; sodium sulfate, 6.5 grains; sodium carbonate, 3 grains; sodium phosphate, 2 grains; potassium sulfate, 6 grains; distilled water enough to make 3½ ounces. A. Gordon³ has used Truneeck's serum by the mouth in 12 cases of disturbed cerebral function the result of vascular disease. Improvement was observed in 9 of the cases. S. Sehouriguine⁴ also reports favorably upon the use of this serum in a patient, aged 80, suffering from arteriosclerosis. After repeated experimentation H. Huchard⁵ believes that Truneeck's serum is a therapeutic delusion and acts, if it acts at all, through autosuggestion. [We should have further evidence of the value of this preparation in so untractable a condition as arteriosclerosis.]

Tuberculin.—F. M. Pottenger⁶ describes the various forms of tuberculin, and the proper methods of administering them. He finds that by using culture products in addition to nutritious food, fresh air, rest, exercise, and hydrotherapeutic measures, 20 % more patients are cured than when these remedies are omitted. H. Quincke,⁷ having observed the effect of tuberculosis and other infections in decreasing the hyperleucocytosis and diminishing the splenic enlargement in leukemia, has tried the effect of tuberculin in 6 cases of leukemia. Three of the patients gave a typical tuberculin reaction. By the end of 4 weeks the leukocytes had diminished from 25 % to 50 %. In 2 the spleen also diminished in size and the general health improved. Arsenic was given at the same time. Quincke would not advise the treatment unless the patient's general condition was fairly good.

¹ Voyenno-meditsinski Jour., Jan., 1903.

² Lancet, April 18, 1903.

³ Phila. Med. Jour., March 21, 1903.

⁴ Thérap. moderne Russe, vol. v, 1902.

⁵ Jour. des Praticiens, No. 18, 1902.

⁶ Therap. Gaz., Jan. 15, 1903.

⁷ Deut. Archiv f. klin. Med., lxxiv, 3-4, 1903.

Urea.—This substance has been highly extolled by Harper [see YEAR-BOOK for 1903] as a remedy for tuberculosis. S. V. Pearson¹ has treated 7 cases with urea at the Brompton Hospital and compares the results with those obtained in 100 cases treated otherwise. Of the 7 patients, the average gain in weight was 4½ pounds and the average length of stay in the hospital 3 months. Of the 100 patients, the average gain was 6½ pounds in the same period. The author concludes from his study that urea exerts no special action on tuberculosis.

Urotropin.—M. Richardson,² after directing attention to the frequency (21 % of all cases) with which typhoid bacilli are found in the urine of typhoid patients and the importance of disinfecting the urine in typhoid fever, states that in urotropin we have a drug which will in the vast majority of cases remove the organisms from the urine, not only in the cases of simple bacilluria, but also in those in which a cystitis has resulted. Janet³ also believes that urotropin (20 grains a day) is the best internal remedy in bacteriuria, but cautions against idiosyncrasy. In one of his cases it excited hematuria; in another, symptoms resembling renal colic. W. Coleman⁴ reports a case of hematuria and hemoglobinuria following a dose of 7½ grains of urotropin, and presents a study of the action of the drug. He finds that toxic actions, especially strangury, occur with comparative frequency if the urotropin is not properly diluted; that individuals vary in their susceptibility, and that the toxic effects are not always correlative with the size of the dose. Urotropin has been known to produce the following symptoms: Irritation of the stomach, diarrhea, abdominal pain, a measles-like rash, headache, tinnitus aurium, renal irritation, albuminuria, strangury, irritant action on raw surfaces in the urinary passages, hematuria, and hemoglobinuria. He concludes that these actions are due to special susceptibility to formaldehyd, to interference with the usual disposition of formaldehyd in the body, or to the liberation of an unusually large quantity of it.

Veronal.—This compound (diethylmalonylurea) occurs as a white, crystalline powder, of a faintly bitter taste, and soluble in 145 parts of water. It represents an attempt to produce a series of substances containing one or more ethyl groups attached to a carbon molecule with 3 or 4 bindings, as in certain alcohols (amylene hydrate) and disulfones (trional). Poly⁵ and Lilienfeld⁶ have found that veronal in doses of from 5 to 8 grains is an active hypnotic, producing sleep in from half an hour to an hour, and causing no bad after-effects, except in some instances slight lassitude. [This remedy offers the hope that we have a safe hypnotic.]

X-rays.—The amount of testimony bearing upon the efficacy of the *x*-rays in carcinoma, lupus, tuberculosis of the skin, acne, psoriasis, and hypertrichosis which has been brought forward during the past

¹ Lancet, Nov. 22, 1902.

² Boston M. and S. Jour., Feb. 5, 1903.

³ Ann. des Mal. des Organ. Génito-urin., No. 3, 1903.

⁴ Med. News, Aug. 29, 1903.

⁵ Münch. med. Woch., 1, 856, 1903.

⁶ Berl. klin. Woch., xl, 19, 1903.

year is so enormous that only brief mention of individual articles can be made. Interesting reports have been published by E. Grubbé,¹ Hyde, Montgomery, and Ormsby,² G. Pfahler,³ C. W. Allen,⁴ C. Skinner,⁵ H. Moseley,⁶ S. Childs,⁷ P. Turnure,⁸ Taylor,⁹ M. Morris and S. Dore,¹⁰ J. Sequeira,¹¹ M. Johnson,¹² W. A. Pusey,¹³ A. R. Robison,¹⁴ D. Brockman,¹⁵ G. Ross and M. Wilbert,¹⁶ and W. B. Coley.¹⁷ So far as malignant disease is concerned, the best results unquestionably have been obtained in cases of rodent ulcer and cutaneous epithelioma. No unfavorable reports on the treatment in these types of carcinoma have appeared. In deep-seated carcinoma the results have been less encouraging. E. Codman,¹⁸ in a report upon the *x-ray* therapeutic work at the Massachusetts Hospital, writes that "Though many cases of deep malignant disease have been faithfully exposed, few have essentially improved and none have been cured. There have been a few encouraging signs in some cases, as relief from pain, gain in weight, shrinking, softening, breaking down of the tumor, etc., but since these events occur in the course of untreated malignant disease the positive advantage of the *x-ray* can hardly be proved." Of 50 cases of deep-seated cancer (mostly cases of cancer of the breast) taken at random from papers published during the year, 2 were apparently cured, 22 were somewhat improved, and 26 were unimproved. In sarcoma also *x-ray* treatment has not proved very successful. In 35 cases, some improvement was reported in 15 and no improvement in 20. A very just estimate of the value of *x-rays* and ultra-violet rays in malignant disease is presented by Roswell Park.¹⁹ As to the therapeutic value of the treatment, he says that this much has been determined: (1) *x-rays* and ultra-violet rays afford methods of treatment for extremely new growths of limited area and superficial character which, while not exactly certain, are extremely promising. (2) They not only cause no pain, but tend to relieve pain, both superficial and deep, in a most pleasing and satisfactory way. (3) They are adapted to cases which can hardly be submitted to any other method of treatment, and they afford more hope in delayed or inoperable cases than does any other method of treatment. (4) It will be found that the odor of putrefaction will often be suppressed by their use and the putrefying process itself checked. (5) Burns and intense dermatitis, so frequently noted when the treatment first came into vogue, may now be almost certainly avoided. (6) More than this, they afford a supplementary method of treatment after operation, by which the benefits of the same may be enhanced and enlarged. (7) It is not necessary to

¹ Med. Rec., Nov. 1, 1902.

² Jour. Am. Med. Assoc., Jan. 3, 1903.

³ Jour. Am. Med. Assoc., Jan. 3, 1903.

⁴ Jour. Am. Med. Assoc., Feb. 21, 1903.

⁵ Med. Rec., Dec. 27, 1902.

⁶ Amer. Med., Jan. 31, 1903.

⁷ Med. News, Jan. 21, 1903.

⁸ Med. Rec., Feb. 7, 1903.

⁹ Liverpool Med.-Chir. Jour., Oct., 1902.

¹⁰ Brit. Med. Jour., June 6, 1903.

¹¹ Brit. Med. Jour., June 6, 1903.

¹² Yale Med. Jour., May, 1903.

¹³ Am. Practitioner and News, Feb. 15, 1903.

¹⁴ Canad. Jour. of Med. and Surg., Dec., 1902.

¹⁵ Railway Surgeon, March, 1903.

¹⁶ Therap. Gaz., Feb. 15, 1903.

¹⁷ Med. Rec., March 21, 1903.

¹⁸ Johns Hopkins Hosp. Bull., May, 1903.

¹⁹ Med. News, May 30, 1903.

intermit such work as the patient may be engaged in, in order to carry out the treatment.

In lupus vulgaris the results of *x*-ray treatment have been almost as favorable as in rodent ulcer. Gamlen¹ reports 11 cases in which a complete cure was obtained. In chronic eczema, psoriasis, and lupus erythematosus the results on the whole have been good. In 18 cases of alopecia areata, treated by Hyde, Montgomery, and Ormsby, prompt return of the hair occurred in 2, marked improvement in 3, and but little or no change in 13. Pusey² reports 11 cases of acne vulgaris treated by Röntgen rays with excellent results. He considers this form of treatment an advance over all other methods hitherto employed. He warns those wishing to use this method of treatment against employing any but the weakest light. Walsh³ reports 4 cases of severe trachoma, 3 of which involved the cornea, treated successfully by the *x*-rays. N. Senn⁴ reports 2 cases of Hodgkin's disease, W. B. Coley⁵ another case, and S. Childs⁶ a third case, all of which were distinctly improved by the *x*-rays. N. Senn⁷ reports a typical case of splenomedullary leukemia which was apparently cured by prolonged use of the *x*-rays. In 5 weeks the spleen, which was so enlarged as to simulate a pregnancy at full term, is said to have been reduced to the normal size. J. P. Marsh⁸ reports a case of mycosis fungoides symptomatically cured by the *x*-rays.

Among the interesting papers dealing with the technic of *x*-ray treatment which have appeared during the last year may be mentioned those by J. Macintyre,⁹ H. E. Gamlen,¹⁰ E. Grubbe,¹¹ L. Schmidt,¹² and Freund.¹³

Xeroform.—E. Toff¹⁴ has found xeroform (tribromphenol bismuth) useful externally as a dusting-powder for wounds, moist eczema, burns, etc., and internally as an antiseptic astringent in various gastrointestinal diseases of childhood. It is tasteless and odorless, and the author has never observed toxic symptoms from its use. The dose recommended is from 8 to 15 grains daily for children under 2 years of age. Dieninger¹⁵ has found xeroform (7 grains 4 times daily) very useful in a case of gastric ulcer.

Yeast.—J. Ullman¹⁶ reviews very carefully the literature bearing upon the subject of brewers' yeast in therapeutics, and comes to the following conclusions: Brewers' yeast, because of its ferments, nuclein, nucleinic acid, and phagocytic action, is a remedy of value in therapeutics; its use is not confined to any one disease, but wherever an increased resistance of the organism is required. It has proved itself of value in furunculosis,

¹ Brit. Med. Jour., June 6, 1903.

² Jour. of Cutan. and Genito-Urinary Dis., May, 1902.

³ Med. Press and Circ., No. 7, 1903. ⁴ N. Y. Med. Jour., April 18, 1903.

⁵ Med. Rec., March 21, 1903. ⁶ Med. News, Jan. 21, 1903.

⁷ Med. Rec., Aug. 22, 1903. ⁸ Am. Jour. Med. Sci., Aug., 1903.

⁹ Brit. Med. Jour., June 6, 1903. ¹⁰ Brit. Med. Jour., June 6, 1903.

¹¹ Jour. Amer. Med. Assoc., Jan. 10, 1903. ¹² Jour. Am. Med. Assoc., Jan. 3, 1903.

¹³ Brit. Jour. of Dermat., Sept., 1902. ¹⁴ Zentralbl. f. Kinderheilk., March, 1903.

¹⁵ Allg. med. Central. Zeitung, No. 61, S. 719, 1902.

¹⁶ Amer. Med., Oct. 11, 1902.

carbuncles, diabetes, tuberculosis, bronchitis, bronchopneumonia, enteroptosis, habitual constipation, cancer, and other affections. Used in cases of advanced tuberculosis, an improvement in symptoms indicative of secondary pyogenic infection was noted. Boigey¹ also draws attention to the various diseases over which yeast exercises a controlling influence, and describes the various methods of administration. He maintains that beer-yeast is one of the best remedies we possess in diabetes mellitus, and ascribes its efficacy to its power of converting starchy matter into alcohol. J. Lardier² reports very favorably upon the use of fresh yeast (5 to 20 grams in sweetened water) in chronic pulmonary diseases, including tuberculosis.

Yohimbin.—Seitz³ reports 2 cases of impotence apparently cured by yohimbin ($\frac{1}{16}$ grain 4 times a day). Loewy and Müller⁴ find that an extract of yohimbin bark, when applied to mucous membranes, induces anesthesia. Like those of cocaine, its effects are said to be transitory.

Zomotherapy.—L. Brown⁵ does not attribute the same value to raw meat in retarding the development of experimental tuberculosis as do Richet and Héricourt [see YEAR-BOOK for 1902]. The author has made a series of experiments on dogs, from which he thinks the following conclusions may be drawn: (1) That raw meat has no perceptible effect on the duration of experimental tuberculosis in dogs if the bacilli are virulent and a sufficient number injected intravenously; (2) that raw meat has no effect on the prolongation of the duration of experimental tuberculosis in dogs, even if the bacilli are attenuated, provided a reasonable quantity be injected intravenously; (3) that under the same conditions dogs fed on a mixed diet with no raw meat may live a much longer time. Regarding the use of meat in pulmonary tuberculosis, Brown thinks it may be said: (1) That meat is highly essential in the dietetic treatment; (2) that much meat with a judicious admixture of carbohydrates, fats, etc., is essential to the treatment; (3) that rare meat is better than meat well cooked; (4) that meat-juice is of great value in suralimentation, as myosin albumin is easily digested by most patients—even the dyspeptic—and it affords a “maximum of nutrient for a minimum of effort” (in a few patients meat-juice causes diarrhea and meteorism); (5) that meat-juice can be taken when patients can take no other form of meat—that is, when there exists a marked repugnance to all solids; (6) that the juice from raw meat seems slightly, if at all, more beneficial than the juice from meat slightly browned; (7) that the disadvantages of preparing and preserving raw meat-juice more than offset its advantages (patients who object to juice from raw meat will willingly take that from meat browned); (8) that meat-juice is of value, as it can be administered in the form of jellies, ices, etc.

¹ Arch. Gén. de Méd., April 7, 1903.

² Thèse de Paris, 1902.

³ Deutsch. med. Woch., Dec. 1, 1902.

⁴ Münch. med. Woch., April 14, 1903.

⁵ Am. Jour. Med. Sci., June, 1903.

PHYSIOLOGY.

BY G. N. STEWART, M.D.,
OF CHICAGO.

Summary.—Among the most interesting contributions to physiology since our last report are those connected with the discovery of secretin by Bayliss and Starling, and the investigation of its action on pancreatic secretion by these authors, Fleig, Delezenne, and others; the researches of Delezenne, Bayliss and Starling, and some of Pawlow's pupils on the activating action of enterokinase on trypsinogen; and of Weinland on the antiferments of intestinal parasites and of the mucous membrane of the stomach and intestine. Cushny, Sollmann, Filchne, and other workers have thrown further light on the mechanism of renal secretion. Phloridzin glycosuria has formed the theme of numerous papers by Lusk and his pupils, Brodie, and others. Herter and Richards have shown that the direct action of adrenalin on the pancreas produces glycosuria. The work of Atwater and Benedict on metabolism has continued to yield valuable results, as is also the case with the work of Loeb and his pupils on the physiologic action of ions.

BLOOD.

Coagulation of Blood.—V. Ducceschi¹ has studied the coagulation of the blood of a number of invertebrates. There is by no means the same uniformity in the macroscopic changes as in vertebrates. In some crustaceans the blood sets within a minute into a compact, gelatinous mass, from which separate after a little time a few drops of a still coagulable fluid. This process, which most closely resembles coagulation in vertebrates, has been previously described. In other invertebrates the resemblance is much less marked. In certain echinoderms, for instance, the perivisceral fluid becomes almost instantaneously turbid when removed from the body-cavity. Then a network is formed which ultimately sinks to the bottom as a single compact flock. Cocain stops coagulation in invertebrates in any phase, possibly by acting on the leukocytes. [It has long been taught that leukocytes are closely connected with coagulation of vertebrate blood. This idea is chiefly based on A. Schmidt's observations that leukocytes are destroyed during coagulation. G. T. Kemp and H. Calhoun² some years ago published observations to show that while the blood-plates break down in normal coagulation the leukocytes do not.] Gürber re-examined the question, and found that in defibrinating

¹ Hofmeister's *Beit.*, Bd. iii, S. 378.
506

² Am. Jour. Physiol., vol. v, p. iv.

rabbit's blood about half of the leukocytes and nearly all the polymorphonuclear leukocytes disappeared. If, however, coagulation was prevented by cooling or by oxalate, no change occurred in the number of leukocytes; and the same was true even when the blood was defibrinated at a low temperature. He therefore concluded that although in unhindered coagulation leukocytes always disappear, this disappearance is not necessary for coagulation. At v. Frey's suggestion, P. G. Bayou¹ has further investigated the subject, and has arrived at the result that the disappearance of the leukocytes in rabbit's blood has no significance for coagulation, as it is not a phenomenon observed in all kinds of blood. In the blood of man, the pig, and the ox no constant difference can be made out in the number of leukocytes before and after coagulation.

Fibrin-ferment.—C. A. Pekelharing and W. Huiskamp² assert that the nucleoprotein of the thymus and also that obtained from blood-plasma is itself the zymogen of the fibrin-ferment. The theory that the action of the enzyme, as was formerly supposed by Pekelharing, consists in the handing over of lime, in consequence of which fibrin is shed out as a lime compound, has been disproved by Hammarsten, and has been given up by its originator.³

Hemolysis.—A. Briot⁴ has investigated the hemolytic action of the venom of the sea-dragon (*Trachinus draco*). Hemolysis takes place under the same general conditions as with the venom of the serpent, but the action is less intense, and much slower than in the case of cobra venom. The hemolytic power of the venom is not easily destroyed by heat. Calmette's anti-venom serum does not act on the venom of the sea-dragon.

G. N. Stewart⁵ has shown that at 0° C. (at which temperature the laking action of sapotoxin is much retarded) an increase in the conductivity of blood, presumably owing to an increase in the permeability of the corpuscles to electrolytes, is caused by that substance before any hemoglobin has been liberated. It seems permissible to divide the action of sapotoxin on the corpuscles into three stages: (1) An action on the envelope, which does not necessarily nor immediately lead to the liberation of the hemoglobin; (2) an action on the hemoglobin or the stroma, which causes the discharge of the pigment; (3) an action on the stroma leading to the setting free of electrolytes.

C. C. Guthrie⁶ has investigated the influence of removal of water from the colored corpuscles on their susceptibility to laking by a large number of solutions of electrolytes and non-electrolytes. The corpuscles are so altered by drying at room-temperature that all solutions containing a certain proportion of water, except such as readily convert the hemoglobin into an insoluble form, cause complete laking.

D. Noel Paton⁷ and A. Goodall have failed to find any evidence that the spleen has an active hemolytic function.

¹ Zeit. f. Biol., Bd. xlv, S. 104.

² Zeit. f. physiol. Chem., Bd. xxxix, S. 22.

³ Proc. Kon. Akad. v. Wetensch, Amsterdam, No. 24, 1900.

⁴ Jour. de Physiol. et Path. gén., tome v, p. 271.

⁵ Am. Jour. Physiol., vol. ix, p. 72. ⁶ Ibid., vol. viii, p. 441.

⁷ Jour. of Physiol., vol. xxix, p. 411.

Reaction of Blood.—[According to the current theories of physical chemistry, the reaction of a solution depends on its content of H and OH ions, and the proportion existing between them, so that an excess of H ions corresponds to an acid, and an excess of OH ions to an alkaline reaction. The titration method cannot inform us as to the actual concentration of the H and OH ions in blood. Accordingly attempts have been made to measure this by determining the E. M. F. of a cell containing blood or serum as one liquid.] P. Fraenkel,¹ for instance, using palladium-hydrogen electrodes, has shown that in defibrinated blood and fresh serum the concentration of the H ions is very near that of water, *i. e.*, these liquids are practically neutral. G. Farkas² has made similar measurements and arrived at the same results. In conjunction with E. Scipiades³ he has made a so-called osmotic analysis of the blood in pregnant women, without discovering any marked difference between it and normal blood.

Hemoglobin.—W. Frieboes⁴ has carefully re-investigated the question whether it is possible to differentiate human from animal blood by the form of the hemoglobin crystals, and comes to the conclusion that this is possible, but that great precautions must be used to avoid error.

LYMPH.

Lymph and Vasomotor Function.—A. Pugliese⁵ asserts that after division or embolism of the medulla oblongata and consequent paralysis of the vasomotor center and vascular dilation, lymphagogues like peptone and caffeine cause no increase in the flow of the lymph. He therefore believes that they act by the vasodilation which they bring about. On the other hand, curara, bile and urea cause an increase in the lymph flow even after the bulb has been eliminated, and accordingly cannot be supposed to produce their effect through dilation of the vessels. The same is true of NaCl, which causes an increase in the formation of lymph, as durable and as great as in the normal animal, and which can continue even after death, a fact in favor of the hypothesis of Asher and Gies.

A. Falloise⁶ states that a watery extract of the jejunum, previously treated with dilute HCl and containing secretin, when injected into a vein causes not only a plentiful pancreatic secretion, but also an increase in the flow of bile and lymph. If an extract of the end of the ileum, which contains no secretin, be injected, there is no increase in the bile or pancreatic juice, but an increase in the lymph-flow. He concludes that the latter is dependent not on a concomitant acceleration of the pancreatic and biliary secretion, but on the action of lymphagog substances present in the extracts of the intestine, *e. g.*, albumoses and bile-acids. [A result opposed to the conception of Asher, that the formation of lymph depends on the activity of the organs. It is obvious that even yet we have not quite got to the bottom of lymph formation.]

¹ Pflüger's Archiv, Bd. xvi, S. 601.

² Ibid., Bd. xcviii, S. 551.

³ Ibid., S. 577.

⁴ Ibid., S. 434.

⁵ Archives Ital. de Biol., tome xxxviii, p. 422.

⁶ Bull. acad. de méd. de Belgique, tome xvi, p. 945; Centralbl. f. Physiol., Bd. xvii, S. 194.

HEART AND CIRCULATION.

The Heart.—O. Langendorff and W. Hueck¹ bring forward evidence that **calcium** acts on the heart-muscle not as the chemical excitant of its automatic contractions, as some physiologists believe, but by rendering it more capable of work.

O. Langendorff² has re-investigated the well-known phenomenon that sometimes when the thorax is opened the diaphragm may be seen to contract synchronously with the heart. [Schiff observed it long ago after section of the phrenic nerves, especially of the left, and he rightly explained the contraction as due to excitation of the phrenic by the action current of the still beating heart. He supposed that the increase of excitability of the nerve produced by the section rendered the excitation effective, whereas with intact phrenics it is ineffective.] Langendorff has often observed the phenomenon in the course of his work on the mammalian heart. He finds that it occurs even when the nerves are not divided and when the thorax is unopened, if the animal be bled. The most probable explanation of this, according to him, is that when the heart is empty it assumes a more favorable position with reference to the phrenics, and particularly the left, so that more of the current of action of the heart passes through them.

Heart-nerves.—The vagus is not stimulated by the action current of the heart, although its situation is also not unfavorable for receiving a portion of it. This is explained by the fact that for such weak currents the frequency of excitation is not sufficiently great to excite the vagus.

The function of the **depressor nerve** has been studied by F. Winkler.³ According to him, the first effect of stimulation of the nerve is a distinct improvement in the work of the heart. The output is increased, as indicated by a fall of pressure in the left auricle, while as yet the carotid pressure remains unaltered. It is necessary to seek the causes of this fall of pressure in the heart itself, since the venous pressure, as he previously showed,⁴ far from being diminished at this stage, is even increased. This initial stage only lasts a short time, and is followed by the well-known marked diminution in arterial pressure. The power of contraction of the heart does not suffer at all by excitation of the depressor. It indeed increases, and the apparent diminution in the work of the organ in the course of stimulation is merely due to the fact that a smaller quantity of blood is reaching the left ventricle. In the function of the depressor we may, therefore, see, according to this writer, an arrangement which prevents overfilling of the heart. The depressor regulates not only the filling of the vessels, but the filling of the heart. According to S. v. Schumacher⁵ and G. Köster and A. Tschermak,⁶ the depressor in all mammals probably ends in the wall of the aorta, and can therefore be called the aortic branch of the vagus. The **nervi accel-**

¹ Pflüger's Archiv, Bd. xvi, S. 473.

² Ibid., xciii, S. 277.

³ Centralbl. f. Physiol., Bd. xvii, S. 38.

⁴ Beitr. zur exper. Path., 1902, S. 1.

⁵ Sitzungsber. de Wien. Akad., Math.-naturw. Cl. exi, Abth. iii, S. 133; Centralbl. f. Physiol., Bd. xvii, S. 14.

⁶ Pflüger's Archiv, Bd. xciii, S. 24.

erantes, on the other hand, in all mammals extend to the ventricles as well as the auricles, and, without exception, the left ventricle receives a larger number of fibers than the right. Since the accelerans is mainly distributed to the ventricles, it can be called the ventricular nerve. After the auricles have been cut away at the auriculoventricular junction, according to H. E. Hering,¹ stimulation of the accelerans causes acceleration and augmentation of the ventricles. The fibers which have this action pass to the ventricles between the aorta and the pulmonary artery.

Dyspneic Stimulation of the Vagus.—M. Verworn² has analyzed the factors which act on the vagus center when respiration is hindered: the increase of blood-pressure increases the excitability of the center; the deficiency of oxygen has a similar effect; and the impulses from the respiratory center cause a rhythmic concomitant excitation of the vagus center.

Action of Substances on the Heart.—E. A. Schäfer and H. T. Secharlier³ state that chloroform exerts a peculiar action on the cardiac muscle. When the heart has been brought to a standstill by inhalation of a mixture of chloroform and air, the heart-muscle will not respond to any kind of stimulation, direct or indirect. The condition is different from paralysis, since a paralyzed muscle can be excited by direct stimulation. The condition occurs after section of the vagi, and even after the administration of atropin, and, therefore, although it appears to be a kind of inhibition, it is due not to excitation of the vagus or its endings, but to excitation of the terminal inhibitory mechanism beyond the vagus endings, whatever that may be.

F. W. Tunnicliffe and O. Rosenheim,⁴ using Locke's method of perfusing the isolated mammalian heart, have studied the effect of the addition of chloroform, ether, alcohol, and acetone in various doses to the nutrient fluid. An interesting result is the practical identity shown to exist between the concentration of chloroform in the fluid which produces serious effects upon the heart and that found by Pohl⁵ in the blood of animals fully narcotized with this drug by inhalation. As regards ether, their experiments, taken in connection with those of Franz,⁶ show that the quantity of this substance in the blood of animals narcotized with it does not seriously affect the heart. It is asserted that in fasting dogs with subnormal temperature food-sustances (butter, e. g.) cause a marked increase in the frequency of the heart, which cannot be due to increase in the body-temperature, since such an increase in temperature as food causes has little effect on the pulse-rate when the initial temperature is subnormal. Barbéra,⁷ however, has not found that the giving of butter increases the pulse-rate. [The psychic excitement which the appearance of appetizing food may cause, especially

¹ Centralbl. f. Physiol., Bd. xvii, S. 1. ² Archiv f. (Anat. u.) Physiol., 1903, S. 65.

³ Jour. of Physiol., vol. xxix, p. xvii. ⁴ Ibid., p. xv.

⁵ Arch. f. exper. Path. u. Pharm., 1891, S. 255.

⁶ Dissert., Würzburg, 1895.

⁷ Archives Ital. de Biol., tome xxxviii, p. 413; Lo Sperimentale, vol. Ivi, 1902,

p. 111; Bull. delle Scienze Med. di Bologna, serie vii, vol. vi.

⁷ Ibid., vol. viii, fasc. 10.

in a fasting animal, is a factor which has to be eliminated, as far as possible, in such experiments, and neglect of these precautions may perhaps account for this discrepancy.]

Blood-flow.—J. A. Tschuewsky,¹ working with Hürthle's stromuhr,² has shown that the mean amount of blood per 100 gm. of head passing through the carotid is much greater than the amount per 100 gm. of the hind-limbs going through the crural artery. Rhythmic tetanic stimulation³ in general causes an increase in the blood-stream through the contracting muscles. The increase depends on the strength of the stimulation and the relative duration of the periods of excitation and repose. During continuous tetanic stimulation the blood-stream diminishes.

Contractility of the Capillaries.—Since Stricker's observations the only kind of active contraction of the capillaries which has obtained general assent is a contraction by a sort of turgescence, so that the thickness of the wall is increased at the expense of the lumen, the total cross-section remaining unchanged. E. Steinach and R. H. Kahn⁴ believe that they have demonstrated a true contraction of the capillaries, in which both the lumen and the total cross-section are diminished. The experiments were made chiefly on the nictitating membrane of the frog. They have discovered in the sympathetic vasomotor fibers, stimulation of which causes true contraction of the capillaries of the nictitating membrane; similar contraction is caused by direct stimulation of the capillaries. They consider that these vasomotor fibers have an important role in the regulation of the blood-supply.

RESPIRATION.

Respiratory Center.—J. Loeb⁵ brings forward further evidence in favor of the view, previously advocated by him,⁶ that in the higher animals the central nervous system is essentially a series of segmental ganglia, as it is known to be in lower forms. Babák⁷ and Philippson⁸ have recently discussed the segmental theory. The rival theory is the "center theory," viz., that the most complicated functions of the body are localized in limited portions of the brain and medulla oblongata. Loeb tries to show that the existence of a respiratory center in the bulb, which is generally considered to be out of harmony with the segmental theory, does not really contradict it. His explanation is that the bulbar respiratory center represents the segmental ganglion for the gills. It is in favor of this that the nerves for the gills in fishes belong to the vagus group. C. J. Herrick⁹ has also shown that the respiratory ganglia in the medulla oblongata in warm-blooded animals are completely homologous, if not identical, with the segmental ganglia for the innervation of the gills in fishes. Loeb suggests that the reason why the respiratory nuclei in

¹ Pflüger's Archiv, Bd. xvii, S. 210.

² YEAR-BOOK, Medicine, 1903, p. 555.

³ Pflüger's Archiv, Bd. xvii, S. 289.

⁴ Ibid., S. 105.

⁵ Pflüger's Archiv, Bd. xvi, S. 536.

⁶ Comparative Physiology of the Brain.

⁷ Ibid., xciii, S. 194.

⁸ Compt. rend. de l'acad. des sciences, tome cxxxvi, p. 61.

⁹ Jour. of Comp. Neurol., vol. ix, p. 153.

the cord cannot discharge themselves until impulses have reached them from the bulbar center is analogous to the reason why the ventricles do not normally contract till an impulse reaches them from the auricles, viz., that the relative concentration of Na and Ca ions in the blood is such as to permit of the contraction of the latter but not of the former.

Phrenic Nerves.—S. Baglioni¹ has called attention anew to the existence in the phrenic nerves of afferent fibers the stimulation of which can influence the respiration after section of the vagi.

Bronchial Muscles.—W. E. Dixon and T. G. Brodie² have examined in detail, by the aid of a plethysmographic method, the innervation of the bronchial muscles and the action of drugs upon them. They find that the bronchoconstrictor fibers run in the vagus; none are found in the sympathetic. Bronchodilator fibers can also be demonstrated in the vagus. There is no central tonus. Contraction of the bronchioles may lead to collapse or overdistention of the lung, according to the force of inflation, on the one hand, and the time allowed for deflation, on the other. Reflex constriction of the bronchi is most readily caused (in dogs and cats) by exciting the nasal mucous membrane, and particularly a small area well back upon the nasal septum. This is of great interest in connection with the results of Francis,³ who states that most cases of spasmotic asthma in which the treatment has been tried have been permanently cured by cauterizing a certain area of the nasal septum high up and toward the back. Muscarin, pilocarpin, and physostigmin excite the endings of the vagus in the bronchial muscles, and cause typical constriction, which is abolished by atropin. Chloroform, ether, urethane, lobelia, and atropin induce dilation of the bronchioles when they are constricted. The dilation produced by lobelia is transient in comparison with that produced by atropin.

V. Maar⁴ has continued the experiments of Henriques on **the influence of the vagus and sympathetic nerves on the gaseous exchange** in the lungs [a question of much importance in relation to the supposed secretory action of the pulmonary membrane]. He finds that in the tortoise stimulation of the peripheral end of the vagus causes a fall of gaseous exchange in the corresponding lung, with an accompanying rise in the other lung. This alteration is independent of the activity of the heart, and the change is greater in the intake of oxygen than in the output of carbon dioxid. Stimulation of the sympathetic only causes an atypic and inconstant alteration in the gaseous exchange. [While these observations would seem to indicate that the vagus contains "secretory" fibers for the lungs, the fact that in the rabbit no such effects can be clearly demonstrated, warns us of the necessity of care in coming to such a conclusion, or, at any rate, in generalizing it.]

Compressed and Rarefied Air.—L. Hill and J. J. R. Macleod⁵ state that the percentage of nitrogen dissolved in the blood in animals exposed to atmospheric air at various pressures always corresponds to Dalton's

¹ Centralbl. f. Physiol., Bd. xvi, S. 649.

² Jour. of Physiol., vol. xxix, p. 97.

⁴ Skand. Archiv, Bd. xiii, p. 269.

³ Lancet, Oct. 18, 1902, p. 1053.

⁵ Jour. of Physiol., vol. xxix, pp. 382, 492.

law if time enough be allowed for the blood to saturate itself. They always found gas-bubbles in the venous system after rapid decompression. Bert's results, which indicated that, as the pressure was increased, a smaller amount of nitrogen than that deduced from Dalton's law went into solution, are due to the fact that he did not allow the animal to remain exposed to the pressure for a sufficiently long time before collecting the sample of blood. To avoid gas embolism on decompression after working in compressed air the shift should be so short that the blood does not get saturated with nitrogen, and decompression should be slow.

DIGESTION.

Salivary Digestion in the Stomach.—Cannon and Day¹ state that (in cats) salivary digestion may go on for an hour or more in the cardiac end of the stomach, since free hydrochloric acid does not appear here before that time. That the contents of the cardiac end are not freely intermixed with those of the pyloric end is shown by the fact that a greater proportion of sugar is found in the former. As might be expected, the difference is more marked with solid than with liquid food.

Temperature of Chorda and Sympathetic Saliva.—R. Burton Opitz² has re-investigated the question whether the temperature of the saliva secreted in response to stimulation of the chorda tympani is sensibly greater than that of the arterial blood, or, rather, in the form which his experiments took, whether stimulation of the nerve produces a rise of temperature in a thermometer inserted into Wharton's duet. He concludes that there is a measurable rise of temperature not only on stimulation of the chorda, but also on stimulation of the sympathetic. When the sympathetic is so strongly or the chorda so weakly stimulated that the quantity of secretion is approximately the same, the increase of temperature is still without exception greater for the chorda than for the sympathetic. [It might be supposed that the difference was due to the increased flow of blood caused by the excitement of vasodilators in the chorda.] But he states that clamping of the artery of the gland is without effect on the amount of the rise of temperature. [We miss any reference to the negative result of Bayliss and Hill,³ who were quite unable to confirm Ludwig's statement that stimulation of the chorda causes an excess of temperature of the saliva as compared with that of the arterial blood and explained his results as due to faulty technic. It is to be desired that this discrepancy should be cleared up.]

Gastric Juice.—C. A. Pekelharing⁴ has investigated the action of alcohol on the secretion of gastric juice in a dog with Pawlow's double esophageal and gastric fistula. Before or during a "sham meal" of meat, alcohol diluted with water was given as an enema (200 to 300 cc. of 5 % alcohol). After the enema the quantity of hydrochloric acid secreted increased in about the same proportion as the quantity of juice, but the

¹ Am. Jour. of Physiol., vol. viii, p. xxviii.

² Pflüger's Archiv, Bd. xevii, S. 309.

³ Jour. of Physiol., 16, p. 351.

⁴ Onderzoek, physiol. Lab. d. Hoogeschool Utrecht, iv, S. 156; Centralbl. f. Physiol., Bd. xvi, S. 785.

pepsin was diminished, reaching a minimum after $\frac{3}{4}$ to $1\frac{1}{4}$ hours. The increase in the total quantity of the juice and in the acid over-compensates the moderate diminution in the digestive power of the juice, so that the net result is beneficial. The action of the alcohol is not only reflex, but also direct, through the portion of it absorbed into the blood. On the other hand, G. B. Wallace and H. C. Jackson¹ believe that alcohol introduced into the intestine stimulates the gastric secretion by a purely reflex action, an action which is not specific, but possessed also by other irritants, such as oil of peppermint.

E. S. London and A. P. Sokolow,² working in Pawlow's laboratory, have studied the influence of hemorrhage on the gastric secretion (in a small portion of the stomach isolated by the Heidenhain-Pawlow method). They conclude that the composition of the blood influences quantitatively and qualitatively the secretion of the gastric juice. They succeeded in establishing what they consider as four distinct types of abnormal secretion.

[In the light of Pawlow's work it is of interest to investigate the gastric digestion at a time when the method of taking food is entirely different from that in the adult (sucking instead of chewing); when the food is perfectly different, and a specially adapted food, viz., milk; when some of the organs of sense are still imperfectly developed (in mammals born blind); and, finally, when all experience is wanting. It may be asked whether the young mammal, like the adult, secretes gastric juice before the food reaches the stomach; and if so, through what sense-organ the stimulus is liberated?] O. Cohnheim and F. Soetbeer³ have investigated the question in puppies from 1 to 18 days old. Sham feeding (sucking the teats of the mother after an esophageal fistula has been made in the younger animals and a double esophageal and gastric fistula in the older) causes secretion of gastric juice, just as in the adult. They conclude, accordingly, that the secretion of gastric juice is a congenital reflex from the reception organs of the head. The individual does not gain this power by experience; it comes into the world with him.

Secretin.—W. M. Bayliss and E. H. Starling⁴ produce evidence that in all vertebrates the secretion of pancreatic juice is normally brought about by secretin, produced in the mucous membrane of the upper part of the intestine under the stimulus of the acid chyme. From the monkey, dog, cat, rabbit, man, ox, sheep, pig, squirrel, and new-born kitten acid decoctions of the mucous membrane were obtained which produced a flow of pancreatic juice in all the animals from which it was convenient to collect the juice. In the goose, tortoise, pig, salmon, dogfish, and skate evidence was also obtained of the presence of secretin.

L. Camus⁵ confirms the statement that secretin seems to be very widespread in the animal kingdom.

C. Fleig,⁶ after discussing Popielski's⁷ experiments and arguments in

¹ Am. Jour. Physiol., vol. viii, p. xvii. ² Centralbl. f. Physiol., Bd. xvii, S. 179.

³ Zeit. f. physiol. Chem., Bd. xxxvii, S. 467.

⁴ Jour. of Physiol., vol. xxix, p. 174.

⁵ Jour. de Physiol. et Path. gén., tome iv, p. 998.

⁶ Centralbl. f. Physiol., Bd. xvi, S. 681. ⁷ YEAR-BOOK, Medicine, 1903, p. 558.

favor of the nonspecific action of secretin and the reflex nervous nature of the excitation of the pancreatic secretion by acid in the intestine, and comparing them with the conclusions of Bayliss and Starling, arrives at the eclectic result that both are in part right, that the presence of acid in the upper part of the small intestine causes, on the one hand, the formation of secretin, which directly excites the secretion of the pancreas, and, on the other, a reflex nervous excitation of that gland. [Since Pawlow's epoch-making discovery of the activating power of the enterokinase of the intestinal juice upon the trypsinogen of the pancreatic juice the subject has been studied by several observers.] Delezenne¹ has attempted to explain the interaction of these juices as an adaptive phenomenon of the same kind as the formation of antitoxins and hemolysins. He believes that enterokinase belongs to the groups of cytases described by Metchnikoff as produced by phagocytes, particularly the white blood-corpuscles (the complements of Ehrlich). The trypsinogen of the pancreatic juice, according to him, plays the part of an intermediary body or amboceptor, which enables the enterokinase to attack the proteid molecule. He asserts that enterokinase, or a substance which produces a similar effect on trypsinogen, is contained not only in the mucous membrane of the intestine, but also² in fibrin, in lymph-glands, in snake venom,³ and even in certain anaerobic bacteria (*e. g.*, *B. subtilis*, the vibrio of Finkler-Prior) and in leukocytes, a statement which is indorsed by L. Popielski.⁴ W. M. Bayliss and Starling⁵ strongly oppose this view. Trypsin, they say, is not an expression for two bodies, enterokinase and trypsinogen, acting together, but is a third substance produced as a result of the interaction of those two bodies, enterokinase acting on trypsinogen like a ferment and converting it into trypsin, according to Pawlow's idea. Enterokinase, they state, is secreted only by the small intestine, and chiefly in the upper end of it. It is not found elsewhere in the body. They go a little beyond Pawlow in the statement that under no circumstances does pancreatic juice, as secreted, contain fully formed trypsin. The smallest trace of enterokinase will convert a large quantity of trypsinogen into trypsin if time be given. Delcenne⁶ has shown that the so-called antitryptic action of the blood⁷ is really an antikinasic acid action; *i. e.*, it inhibits the activating power of enterokinase on trypsin. H. Stassano and F. Billon⁸ believe that the secretion of enterokinase observed during digestion, or caused by injection of Fe or Hg salts, is to be ascribed to the increase of diapedesis of the leukocytes which always takes place in the intestine under these conditions.

Antifermenents.—E. Weinland,⁹ following up a suggestion of J.

¹ Compt. rend. de la Soc. de Biol., 1901, p. 1161.

² Compt. rend., tome cxxxv, p. 252; Compt. rend. de la Soc. de Biol., tome liv, p. 998.

³ Compt. rend., tome cxxxv, p. 328.

⁴ Centralbl. f. Physiol., xvii, p. 65; Russky Wratsch, 1902, No. 18.

⁵ Jour. of Physiol., vol. xxx, p. 61.

⁶ Compt. rend. de la Soc. de Biol., Jan. 30, 1903.

⁷ Cf. K. Glaesner, Ver. d. Berl. physiol. Ges., Archiv f. Physiol., 1903, S. 389.

⁸ Compt. rend., tome cxxxv, p. 322.

⁹ Zeit. f. Biol., Bd. xliv, S. 1.

Frenzel,¹ has made the important discovery that the parasitic worms (living in stomach, intestine, liver, etc.) are protected against the proteolytic ferments excreted in these organs or contained in the juices by specific antiferments, *i. e.*, substances which inhibit the action either of pepsin or of trypsin or of both. These substances can be precipitated from the expressed juice of the worms by alcohol, without completely losing their activity. Fibrin can be impregnated with them, and it is then, just like the "living tissue," rendered for a longer or shorter time unassailable by the proteolytic ferments. In a second paper² he extends these results to the stomach and intestine of the higher animals. Here, too, the mucous membrane is protected against the attack of the proteolytic ferments by antiferments contained in the cells, and which can be extracted from them. The gastric extract contains not only an antipepsin but an antitrypsin too.

Autolysis.—M. Oker-Blom³ has investigated the influence of autolytic processes and of bacterial action on the proteids of blood-serum and muscle-juice by measuring the electric conductivity from time to time. He confirms, what was previously shown by G. N. Stewart,⁴ that the conductivity increases progressively as decomposition goes on.

ABSORPTION.

Absorption of Fat.—H. v. Tappeiner⁵ (after experiments by M. Eschenbach, L. Lichtwitz, and Gmeiner), also Eschenbach,⁶ Lichtwitz,⁷ Gmeiner,⁸ and A. Jodlbauer,⁹ discuss the action of certain drugs on the absorption of fat in the small intestine [a subject which in the last few years has again begun to excite the interest of physiologists in a high degree, especially since the work of Pflüger¹⁰ has shown that the absorption of fat in soluble forms is far more important than has hitherto been supposed]. Of all the substances investigated, oil of mustard and quassein (the bitter principle of quassia wood) alone caused an increase in the absorption of fat. [As only one experiment was made with quassein, very little weight can be given to its supposed action.] Curiously enough, crystallized dog's bile had no effect on fat absorption, at least in the quantity employed.

Absorption of Iron.—H. Landau¹¹ concludes that iron salts, absorbed exclusively in the duodenum, are chiefly accumulated in the spleen, as demonstrated by the microchemical reaction with ammonium sulfid on ferrocyanogen, but also in the liver and bone-marrow, in both situations probably in the form of an organic compound. The iron is excreted chiefly through the cecum, through the large and small intestines, and to a much smaller extent through the convoluted tubules of the kidney. The addition of salts of iron to the food of rabbits increases very markedly

¹ Archiv f. (Anat. u.) Physiol., 1891, S. 293. ² Zeit. f. Biol., Bd. xliv, S. 45.

³ Skand. Archiv, Bd. xiv, S. 48; Centralbl. f. Physiol., Bd. xvii, S. 73.

⁴ Jour. of Exper. Med., vol. iv, p. 235; YEAR-BOOK, Medicine, 1900, p. 583.

⁵ Zeit. f. Biol., Bd. xlv, S. 223.

⁶ Inaug. Diss., München, 1897.

⁷ Inaug. Diss., Leipzig, 1901.

⁸ Zeit. f. Tiermedizin, N. F. vi.

⁹ Zeit. f. Biol., Bd. xlv, S. 239.

¹⁰ YEAR-BOOK, Medicine, 1903, p. 561.

¹¹ Zeit. f. klin. Med., Bd. xlvi; Centralbl. f. Physiol., Bd. xvi, S. 551.

the iron-content of the liver and spleen, and exercises a favorable influence on the development and general condition.

The relation of the lymphatic apparatus of the intestine to absorption has been made the subject of a research by L. Asher and A. Erdely,¹ who believe that they have been able to establish a relation between the kind of food being digested and the histologic characters of the leukocytes in the intestinal lymphatics.

URINE.

Secretion of Chlorids.—T. Sollmann² and Sollmann and Hatcher³ discuss the conditions governing the secretion of chlorids in the urine. As regards the mechanism of chlorid retention, which takes place under various conditions,—for example, in salt-hunger and under the influence of certain diuretics,—the essential factor seems to be the lowered quantity of unbound sodium chlorid in the serum, not the absolute amount of sodium chlorid in the serum, nor the dilution of the serum, nor the presence of foreign salts nor the diuresis. The small percentage of Cl in the urine is mainly due to the urine being originally secreted with a low Cl content and not to secondary secretion of water into the renal tubules nor to reabsorption of Cl. The uninjured renal cells appear to secrete only free and not combined NaCl. This property is not affected in the dog by diuretics or nephritic poisons, whereas in the rabbit these agents cause excretion of combined NaCl.

Saline Diuresis.—A. R. Cushny,⁴ on the other hand, restates and supports by new experiments his belief that some of the phenomena of saline diuresis can be best explained by assuming that absorption of salts and water takes place from the renal tubules, various salts being absorbed in different amount. He looks upon saline diuresis as due not primarily to stimulation of excretory cells in the kidney, but to changes in the renal circulation, for when these are excluded, the injection of salt solution causes little or no change in the urine, while an increase in the volume of the blood without change in its constituents seems sufficient to cause diuresis. [The diuresis observed by Cushny after injection of serum into the blood, if we leave out of account the possibility, which he freely admits, that the injected serum might not be quite similar to that of the animal which received the injection, cannot be explained, he thinks, as due to stimulation of "excretory" cells. In coming to this conclusion, however, he seems to have left out of account the consideration that if these cells are "stimulated" to separate the constituents of urine from serum circulating at a given rate through the kidney in the undiluted olood before injection, as can, of course, be assumed, since some urine is then being formed, we may expect that more urine will be separated when a larger quantity of serum is offered to these cells, through the increase in the velocity of the renal circulation produced by increasing the volume of the circulating liquid. If, e. g., the presence of

¹ Centralbl. f. Physiol., Bd. xvi, S. 705.

² Am. Jour. Physiol., vol. viii, p. 155; vol. ix, p. 425.

³ Ibid., vol. viii, p. 139.

⁴ Jour. of Physiol., vol. xxviii, p. 431.

an excess of water or of any of the solid constituents of serum above a certain "neutral" concentration acts as a stimulus to the renal cells, a larger absolute amount of water or of solids must be removed by the kidneys after the serum injection before the neutral point is reached. It is doubtful whether the fact that after injection of salt solutions into the blood no sensible diuresis occurred if the volume of the kidney was kept normal, in spite of the dilation of its vessels, by artificially diminishing the flow of blood through the renal artery, is decisive. For if there is any local action of the salt in dilating the small vessels of the kidney, the blood-pressure in the renal artery might have to be reduced below the original pressure to bring the volume of the organ back to the normal. In this case the velocity of the renal circulation might be less than normal.]

W. Filehne and W. Ruschaupt¹ find that when the outflow from one kidney is hindered but not completely stopped, the percentage of NaCl during diuresis produced by that salt is never diminished, but sometimes increased, although the quantity of urine secreted by that kidney is always lessened. With sodium sulfate diuresis, on the other hand, the hindered kidney always excretes a greater proportion of the sulfate, while the percentage of NaCl is lower than on the normal side. A very similar result has been reached by Cushny² in regard to sulfate. [It is interesting to notice that the latter observer explains this as the consequence of relatively greater reabsorption of the chlorid than of the sulfate in the renal tubules, while Filehne looks on it as the consequence of a relatively greater original excretion of the sulfate than of the chlorid. It is clear that physiologists are still far from unanimity in regard to the mechanism of urinary secretion.] This is further emphasized by the experiments of W. v. Sobieranski.³ He finds characteristic histologic alterations in the renal epithelium under the influence of various diuretics; in saline diuresis, for instance, the appearance of the "brush-border" in the cells of the convoluted tubes. This is also seen in urea diuresis if the dose is large, but is not produced in diuresis excited by caffein. Although the microscopic appearances in the renal epithelium are totally different in salt and caffein diuresis, there is in both an increase in the quantity of the urine and in the urea. He sees in this a strong argument against the Bowman-Heidenhain hypothesis that the urea and similar constituents are separated by the epithelium, while the water and salts pass mainly through the glomeruli. G. Madrakowski⁴ also states that the granules of the renal epithelium exhibit a characteristic behavior in diuresis produced by various agents.

L. Asher⁵ has studied the influence of the metabolic activity of the kidney in the synthesis of hippuric acid on the secretion of the urine. He concludes that while the synthesis is taking place the cells of the kidney become more permeable to NaCl, and he justly remarks that a connection between cell activity of this kind and the power of separation

¹ Pflüger's Archiv, Bd. xciv, S. 409.

³ Pflüger's Archiv, Bd. xcvi, S. 135.

⁵ Zeit. f. Biol., Bd. xlvi, S. 143.

² Loc. cit.

⁴ Ibid., S. 217.

of the kidney for NaCl is in favor of the view that this power is due to an active cell process. The phenomena of diuresis seen when small quantities of NaCl are continuously injected into the blood are not sufficiently explained by the assumption of a filtration through the glomeruli and reabsorption in the tubules. For instance, the NaCl content of the urine continually increases and soon exceeds that of the blood, while the molecular concentration of the urine diminishes, although that of the blood has increased.

O. Loewi¹ concludes that in the glomeruli there takes place a filtration of water and of all the crystalloids (urea, NaCl, sulfates) which are present in the blood in free solution. Somewhere in the kidney, probably in the cells of the tubules, there is, in addition, a secretion of these substances which circulate in the blood in colloid combination; for instance, phosphates. Finally, a reabsorption of water and solids takes place in the tubules, the absorption of the solids depending not only on their diffusibility, but also on the condition of the renal cells for the time being; for example, whether they are poor or rich in NaCl.

Permeability of the Bladder.—It has been shown by Galeotti² that chloroform can profoundly modify the permeability of animal membranes, without producing changes in the microscopic structure of the epithelium. In conjunction with Fasola,³ he has extended his observations to the urinary bladder. Under the influence of chloroform this comes to behave as a semipermeable membrane, across which osmotic equilibrium is very rapidly established between the contents of the bladder and the blood. The alteration of the epithelium is purely functional; there are no histologic lesions. When the equilibrium is normal, osmotic equilibrium [as is well known] is not in general established. No change in the volume or concentration of hypotonic solutions introduced into the bladder takes place. Nor is there any change in isotonic solutions (of cane-sugar or NaCl) if the animal was previously well supplied with food and water. It is interesting, however, that in animals deprived of food and water a partial absorption takes place even from isotonic solutions. In the case of hypertonic solutions of NaCl there is considerable absorption of salt.

Phloridzin Glycosuria.—[The most generally accepted view of the mechanism of phloridzin glycosuria is that the kidneys are rendered more permeable to the sugar of the blood, so that the sugar is swept out of the circulation.] T. G. Brodie and R. L. Siau⁴ have published experiments, however, which they believe cannot be reconciled with this explanation. In confirmation of Zuntz,⁵ they show that injection of phloridzin into one renal artery produces glycosuria from the corresponding kidney sooner and to a greater extent than from the other. This, of course, is in accordance with the current doctrine. But they go further, and show that perfusion of a surviving kidney with blood containing phloridzin

¹ Archiv f. exper. Path. u. Pharm., Bd. xlvi, S. 410; Centralb. f. Physiol., Bd. xvii, S. 98.

² Zeit. f. physikal. Chem., Bd. xl, Heft. 4.

³ Jour. de Physiol. et Path. gén., tome v, p. 491.

⁴ Jour. of Physiol., vol. xxix, p. 467.

⁵ Arch. f. Physiol., 1895, p. 570.

produces diuresis, the urine containing such an amount of sugar as cannot be accounted for by the sugar that disappears from the blood. From this and other facts they conclude that the glycosuric effect of phloridzin is due to a specific action on cells of the renal tubules by which they acquire the power of producing sugar, just as the cells of the mammary gland produce lactose. [But this is certainly not a complete explanation of phloridzin glycosuria.] For example, P. G. Stiles and G. Lusk,¹ in answer to the question raised by Cremer,² whether under the influence of phloridzin the organism loses the power to burn dextrose, state that within limits this is actually the case.

As to the source of the sugar in phloridzin glycosuria, A. R. Mandel and G. Lusk³ have demonstrated by respiration experiments on the dog that the heat equivalent of the sugar excreted in the urine is made up for in increased protein metabolism, while no more fat is burned than in a normal animal, whether the diabetic dog be fasting, or fed on meat alone, or on meat and fat together.

Adrenalin Glycosuria.—C. H. Vosburg and A. N. Richards⁴ have further elucidated the mechanism of adrenalin glycosuria by showing that the sugar-content of the blood increases in the diabetes caused by the action on the pancreas of adrenalin injected into the peritoneal cavity. Sugar usually appears in the urine within a few minutes. [Metzger⁵ had previously shown that the blood-sugar increases markedly after subcutaneous injection of adrenalin.] But after the sweeping out of the sugar from the blood of a fasting dog by phloridzin, according to Herter and Richards,⁶ the intraperitoneal injection of adrenalin produced no glycosuria even in 4 hours, although in the next 4 hours a small amount of sugar was found in the urine.

D. N. Paton⁷ comes to the conclusion that the glycosuria (caused by subcutaneous injection of adrenalin in dogs and rabbits) is due to a toxic action of that substance and not to diminished oxidation owing to the vascular constriction. This is indicated, according to him, by the extent of the glycosuria, which is far more marked than that observed as the result of mere interference with oxidation, and also by the fact that in guinea-pigs, where the vascular changes are relatively great, the glycosuria is not prominent. [The observations of Herter and his fellow-workers indicate that the effect is produced through the pancreas and not directly.] Thus, C. A. Herter and J. Wakeman⁸ found that while subcutaneous injection of adrenalin chlorid caused a mild, and intravenous injection a greater glycosuria, intraperitoneal injection caused the greatest glycosuria of all. Direct application of the solution to the pancreas had a greater effect than direct application to the liver, spleen, or kidney. The effect on the pancreas is so specific that they believe they are entitled to speak of this glycosuria as essentially pancreatic, and suggest that the drug influences in some way the power of oxidation of the pancreatic cells.

¹ Am. Jour. Physiol., vol. x, p. 67. ² Ergebnisse d. Physiol., Bd. i, 1902, S. 883.

³ Am. Jour. Physiol., vol. x, p. 47. ⁴ Ibid., vol. ix, p. 35.

⁵ YEAR-BOOK, 1903, Medicine, p. 570. ⁶ Med. News, 1902, vol. lxxx, p. 201.

⁷ Jour. Physiol., vol. xxix, p. 286. ⁸ Virchow's Archiv, Bd. clxix, S. 479.

D. Hess¹ has tested by experiments the hypothesis that in disease of the pancreas an unknown substance, which is normally rendered harmless by the pancreas, accumulates in the organism, and causes diabetes. He injected into normal dogs the blood-serum of dogs whose pancreas had been extirpated, in order to excite the pancreas of the former to increased internal secretion. Then later on he injected the serum of these normal dogs into diabetic dogs with the idea of diminishing the glycosuria. The result was almost negative, only on the day of the serum injection was there any diminution in the excretion of sugar.

H. Lüthje² finds in dogs deprived of the pancreas, as Cremer did in dogs under the influence of phloridzin, that glycerin, given by the mouth, caused an increase in sugar excretion up to two or three times the original amount. The giving of fat does not increase the amount of sugar excreted, but this is increased by lecithin or lecithin-containing substances such as egg-yolk. These should accordingly be avoided in cases in which a strictly antidiabetic diet is desired.

Alimentary Glycosuria after Narcosis.—E. Bendix³ states that while dogs after chloroform narcosis lasting half an hour to an hour excrete no sugar, glycosuria regularly occurs when sugar (30 gm.) is previously given.

Hydruria, according to C. Eckhard,⁴ can be produced in the rabbit, without glycosuria or with only a very small trace of sugar in the urine, by a lesion in a portion of the funiculi teretes which can be reached in the floor of the fourth ventricle. He explains the hydruria as the result of constriction of the peripheral vessels due to excitation of vasomotor nerves. The arterial pressure is thus increased.

INTERNAL SECRETION.

Thyroid.—F. Blum⁵ has made an interesting study of the psychoses developed in dogs deprived of the thyroid. On a milk diet, with the gradual addition of meat, they live a long time. Some of them show psychic disturbances in the form of hallucinations, alteration of the character (timidity and desire to wander), pathologic motor phenomena going on to spasms.

J. Katzenstein⁶ maintains, against the attack of Lübcke,⁷ his position that after section of its nerves the thyroid completely degenerates.⁸

Islands of Langerhans.—L. W. Ssobolew⁹ supports the now generally received conclusion that the islands of Langerhans form the internal secretion of the pancreas which governs the carbohydrate metabolism so far as this is governed by the pancreas. For instance, after ligation of the pancreatic duets in rabbits, cats, and dogs, the ordinary glandular

¹ Münch. med. Woch., 1902, S. 1449. ² Münch. med. Woch., 1902, S. 1602.

³ Centralbl. f. Stoffenschelkrankh., March, 1902.

⁴ Zeit. f. Biol., Bd. xliv, S. 407; Centralbl. f. Physiol., Bd. xvii, S. 197.

⁵ Neurol. Centralbl., Bd. xxi, S. 695. ⁶ Virchow's Archiv, Bd. clx, S. 170.

⁷ Centralbl. f. Physiol., Bd. xvi, S. 217. ⁸ YEAR-BOOK, 1900, Medicine, p. 514.

⁹ Virchow's Archiv, Bd. clviii, S. 91; Centralbl. f. Physiol., Bd. xvii, S. 17.

tissue atrophied, but the islands for the most part remained intact, and no sugar appeared in the urine.

Thymus.—S. Vincent¹ denies that extirpation of the thymus in frogs is necessarily fatal, as was asserted by Abelous and Billard.² The explanation of this difference of opinion is probably to be found in the result of Ver Eecke³ that death does not occur if precautions are taken to avoid infection by careful renewal of the water in which the animals are kept. In guineapigs Vincent finds that removal of the thymus produces no effect. Similarly in dogs it was found by Tarulli and Lo Monaco⁴ that the thymus is not indispensable, although in young animals the loss of the organs caused transient disturbances of nutrition, lessening muscular power, and a diminution in the number of red blood-corpuscles. These symptoms disappeared when the animals grew older. [It would seem that the importance of the organ varies in different groups of animals.] S. Vincent⁵ has been unable to discover any specific effect produced by the intravascular injection of extracts of the thymus. There is a certain fall of blood-pressure, but a similar fall is caused by almost any tissue in the body. For instance, as Vincent and W. Sheen⁶ have shown, extracts of nervous tissue, muscle, kidney, spleen, liver, testis, pancreas, ovary, and lung all contain a depressor substance or more than one. In watery extracts of the brain there seem to be, from the experiments of S. Vincent and W. Cramer,⁷ not less than three substances which diminish the blood-pressure on injection. Halliburton's statement⁸ that in certain varieties of pathologic blood the depressor substance is choline is, according to them, based on erroneous observation. [Halliburton certainly has not proved it to be choline by satisfactory tests.]

Pineal Gland.—E. v. Cyon,⁹ returning to the question already discussed by him,¹⁰ whether any mechanism exists inside the cranial cavity for the automatic regulation of the cerebral pressure, adduces evidence in support of his view that the pineal body has the function of protecting the brain against an excessive rise of pressure. It is true that extracts of the gland when injected into the circulation have no effect other than that produced by the inorganic constituents of the "brain sand," so that the regulation is not a chemical one. On the other hand, by electric stimulation he was able to cause a contraction of the gland and also a slight change in its position, due, he believes, to the muscular fibers in it described by N. Nicolas.¹¹ On the strength of this result he attributes to the pineal body the role of mechanically regulating the flow of the cerebrospinal fluid in the aqueduct (according to the pressure in the third ventricle) by narrowing or widening it. [These experiments do

¹ Proc. Physiol. Soc., Jour. of Physiol., vol. xxx, p. xvi.

² Arch. de Physiol., Série 5, tome viii.

³ Travail du lab. de Physiol. de Gand, 1899.

⁴ Bull. acad. med. di Roma, xxiii, p. 31.

⁵ Proc. Physiol. Soc., Jour. of Physiol., vol. xxx, p. xvii.

⁶ Jour. of Physiol., vol. xxix, p. 242.

⁷ Proc. Physiol. Soc., Jour. of Physiol., vol. xxx, p. x.

⁸ Croonian Lectures, 1901.

⁹ Pflüger's Archiv, Bd. xcvi, S. 327.

¹⁰ Ibid., Bd. lxxxvii, S. 576.

¹¹ C. R. Soc. de Biol., Oct., 1900.

not seem to us convincing, all the more that very strong currents seem to have been necessary to produce the effects described.]

Testicle.—G. Loisel¹ concludes from the facts of general and comparative physiology, that the testicle has two physiologic functions: internal secretion, the real or primary function, which lasts throughout life, and external secretion, the production of the spermatozoa. In virtue of its internal secretion it is a considerable destroyer of fat; hence the greater leanness of the male than the female, and the increase in fat in the castrated male. [A. Loewy and P. F. Richter² showed by exact experiments that after castration a specific diminution of resting metabolism takes place.] The opposite result of Lütje³ is explained by Loewy and Richter⁴ as due to the fact that, under certain circumstances, this specific diminution of metabolism may be balanced by conditions which cause an increase in the metabolism.

METABOLISM.

Glycogen.—E. Pflüger⁵ has published a complete monograph on this subject. He gives up the view he has hitherto held, that the liver-cells can form sugar from carbohydrate-free substances by synthetic processes, and now maintains that glycogen arises exclusively from carbohydrates. Discussing the pathology of diabetes, he states his belief that it always implies some nervous disturbance. When the stimulation from the sensory nerves, the brain, the spinal cord, or the liver-cells themselves is excessive, the inhibitory action of the antidiastase of the pancreas is no longer sufficient to maintain the normal balance between sugar-production and sugar-consumption, and then there is diabetes, notwithstanding the absence of pancreatic disease. On the other hand, when the pancreas is diseased and no longer produces antidiastase, sugar accumulates in the blood in consequence of its continual production in the liver under the influence of reflex nervous impulses.

In this connection O. Cohnheim⁶ comes to the interesting conclusion that while no glycolytic ferment can be demonstrated in the pancreas and only an exceedingly weak one in muscles (Lauder Brunton,⁷ Brunton and Rhodes⁸), by combining pancreas and muscles distinct glycolysis can be made out, and this is a ferment action. One can see in this process an analogy either with the fact discovered by Ehrlich, that for the action of lysins complement and intermediary body are necessary, or with the action of Pawlow's enterokinase on the trypsinogen of the pancreatic juice.

Proteid Metabolism.—P. A. Levene and L. B. Stookey⁹ attempt to explain the fact that the proteids of the food have to be decomposed

¹ Compt. rend., tome cxxxv, p. 250.

² YEAR-BOOK, 1900, Medicine, p. 515.

³ Arch. f. exper. Path. u. Pharm., Bd. xlvi; Centralb. f. Physiol., Bd. xvi, p. 447.

⁴ Centralb. f. Physiol., Bd. xvi, S. 449.

⁵ Pflüger's Archiv, Bd. xcvi, S. 1; Richet's Dict. de Physiol.; Centralb. f. Physiol., Bd. xvii, p. 269.

⁶ Zeit. f. physiol. chem., Bd. xxxix, S. 336.

⁷ Ibid., Bd. xxxiv, S. 487.

⁸ Centralb. f. Physiol., Bd. xii, S. 353.

⁹ Am. Jour. Physiol., vol. viii, p. xxiii.

before they can be utilized in the body. Applying the precipitin test, they have observed that different proteids of a given animal, and perhaps of a given species, possess a similarity which distinguishes them from all proteids of any other origin. The molecule of foreign proteid has therefore to be rebuilt in order to become a molecule of body-proteid in the given animal.

Alcohol.—W. O. Atwater and F. G. Benedict¹ have published an exhaustive report of their experiments with the respiration calorimeter on the nutritive value of alcohol. They have proved that alcohol "spares" fat and also some proteid, and is therefore theoretically a food-substance. The addition of 130 grams of sugar to the daily food caused a sparing of 0.3 gram N. The substitution of 72 grams of alcohol for the sugar caused 0.2 gram N to be spared. W. Caspari² gives a good critical account of the literature on the value of alcohol as a food. F. S. Lee³ has continued his work on the action of alcohol on contractile protoplasm,⁴ extending his experiments to the bell of the medusa, *Gonionema*.

Re-alimentation.—Svenson,⁵ studying the metabolism (nitrogenous and respiratory), in convalescents from typhoid fever and pneumonia, has reached the conclusion that during convalescence the combustion in the organism increases instead of diminishing. A. Pugliese⁶ has compared the glycogenetic function of the liver and that of the muscles in dogs put on a given diet for 3 or 4 days, then starved for a time, and then put again on the original diet, with the result that at first during re-alimentation the hepatic glycogen and the muscular glycogen behave differently. While glycogen accumulates in the liver in greater quantity than under normal conditions of nutrition, in the muscles it at first accumulates much less rapidly than normal. In the first days of re-alimentation the liver increases in weight in a greater ratio than the rest of the body.

Sodium Chlorid.—C. M. Belli⁷ has re-investigated the question of the effect of deficiency of salt on the assimilation of the food and on the nitrogenous metabolism in man. He saw no modification in the digestive functions nor in the assimilation of the food, but a small, though distinct, influence on the N metabolism, which was accelerated when NaCl in addition to that in the food was not given. He therefore considers that NaCl is not a mere condiment, but a substance which has a proteid-sparing action, in accordance with the opinion of Dubelir,⁸ Gabriel,⁹ Pugliese,¹⁰ Straub,¹¹ and Gruber.¹²

¹ Mem. of Nat. Acad. of Sciences, Washington, 1902, vol. vii, 6, p. 231.

² Fortschritte d. Med., 1902, S. 1121. ³ Am. Jour. Physiol., vol. viii, p. xix.

⁴ YEAR-BOOK, 1903, Medicine, p. 570. ⁵ Zeit. f. klin. Med., Bd. xlili, p. 86.

⁶ Jour. de Physiol. et Path. gén., tome v, p. 666.

⁷ Zeit. f. Biol., Bd. xlv, S. 182. ⁸ Ibid., Bd. xxviii. ⁹ Ibid., Bd. xxix.

¹⁰ Atti della R. Accad. dei Fisiocritici in Siena, vol. vi, Série iv.

¹¹ Zeit. f. Biol., Bd. xxxvii, S. 527; xxxviii, S. 537. ¹² Ibid., Bd. xlili.

ANIMAL HEAT.

Man as a Heat-engine.—K. Schreber¹ discusses the relation of the production of heat in the animal body to the second law of thermodynamics. He believes that the organism cannot be considered a heat-engine, and that only a small part of the work in man is obtained as in a heat-engine, while the main portion is obtained from the chemical energy of the food through some other intermediate form of energy. Zuntz² combats this view and [very justly] remarks on the difficulty of at present answering the question satisfactorily. But Schreber's idea that the body is a kind of accumulator which stores up the energy produced by chemical changes during rest, and uses up this store during work, is certainly erroneous; for the experiments of Rubner and of Atwater and Benedict³ have shown conclusively that in the dog and in man the heat given off during rest is the full combustion heat of the food-substances used up, and that there is therefore no storing up of energy.

E. Aronsohn,⁴ from experiments in which the skeletal muscles were eliminated by curara, has found that in fever caused by **puncture of the brain** the skeletal and perhaps also the visceral muscles are the great seats of the increased heat-production.

MUSCLE, NERVE, AND ELECTROPHYSIOLOGY.

Rigor Mortis.—O. Folin⁵ states that if frog's muscles are cooled to -15° C., they go into rigor, and do not recover their irritability on thawing. They can be cooled to -7° C. without going into rigor, and when thawed out they are still excitable. He believes that his results render Kühne's explanation of rigor mortis as a coagulation untenable. In the rigor produced by cold the muscle, instead of becoming opaque, as in rigor mortis, remains perfectly translucent. [But we must not too hastily assume that this cold rigor is precisely the same process as spontaneous rigor mortis.] For example, J. E. Mangold⁶ asserts that both mammalian and frog's muscles, after rigor mortis has come on, regain their excitability in 0.8 % NaCl solution. This is even the case where the rigor mortis has not only developed itself, but has spontaneously passed off again. Frog's muscles, which, kept in the moist chamber, had lost the last trace of excitability after 94 hours, with commencing resolution of rigor, became again excitable in 0.6 % NaCl solution in spite of the strong smell of putrefaction, and remained excitable up to the one hundred and forty-second hour after the death of the animal. [The results of Kulibakko⁷ and others have shown how extraordinarily tenacious of life the heart is, otherwise we should hesitate to accept such statements.]

Nature of Nerve-activity.—[Numerous electric theories of nerve-

¹ Phys. Zeit., Bd. iii, S. 107, 261.

² Ibid., p. 184.

³ YEAR-BOOK, 1901, Medicine, p. 555; Bull. No. 109, U. S. Dept. of Agriculture.

⁴ Virchow's Archiv, Bd. clxix, S. 505.

⁵ Am. Jour. Physiol., vol. ix, p. 374.

⁶ Pflüger's Archiv, Bd. xcvii, S. 498.

⁷ YEAR-BOOK, 1903, Medicine, p. 557.

activity have been put forward of recent years, most of them based on the assumption that the nerve-stream (action current) is an electrolytic rearrangement of the ions propagated from point to point.] A. Lehmann¹ goes so far as to assert that without doubt a living nerve in activity behaves in its electric relations as a series of concentration cells abutting on each other, which are produced by the stimulus causing a difference in the concentration of the ions and therefore an E. M. F. [This suggestion is not new, but he produces some fresh support for it.] On the other hand, S. Tchiriev² contends that it is absolutely impossible to identify, as Hermann has done, the electrotonus of nerves with the action of the voltaic current upon artificial polarisable schemes. He asserts that the electrotonic currents of nerve depend not on the anatomic but on the physiologic (molecular) structure of the nerve. [This vague hypothesis acquires precision if we assume, as there is good evidence for doing, that the core of the nerve-fiber is surrounded by a sheath relatively impermeable to the ions of the liquids in contact with it, which may be considered a property possessed by cell-envelopes in general, as pointed out by the author of this abstract³; and further illustrated by the observations of G. Galeotti⁴ on various membranes, as rabbit's mesentery, tortoise bladder, etc. The applicability of this idea to the explanation of the electrotonic currents is not affected, even if we admit the justice of W. Brüning's⁵ severe arraignment of the attempt of Oker-Blom⁶ to identify the electric currents which one can obtain by the use of dead or living muscles as constituents of liquid cells with true demarcation currents.

A. P. Mathews⁷ has shown that a difference of electric potential exists between the cut surfaces of the stems of certain hydroids, the head, or polyp surface, being always negative to the stolon surface. The maximum difference is approximately one-third of the current of injury in the frog's sciatic nerve, and is obtained in fresh, growing stems when one surface is taken near the polyp. He endeavors to connect this electric polarity with the so-called physiologic polarity, which he considers due, in part at least, to the electric differences set up by unequal degrees of activity in the protoplasm at different regions.

J. Loeb and W. J. Gies,⁸ in a research on the antitoxic actions of ions, confirm Loeb's previous observation that the valence of the kation plays a great part in determining the degree of activity of antitoxic solutions of electrolytes. In general the antitoxic activity of bivalent kations is very much greater than that of univalent. Solutions of nonconductors, such as urea, cane-sugar, glycerin, and alcohol, have no antitoxic action on the solution of an electrolyte, except where the nonconductor can diminish the concentration of the poisonous ions by the formation of

¹ Pflüger's Archiv, Bd. xcvi, S. 148.

² Jour. de Physiol. et Path. gén., tome v, p. 469.

³ Jour. of Physiol., vol. xxiv, p. 211.

⁴ Zeit. f. physik. Chem., Bd. xlv, S. 65; Ibid., Bd. xl, S. 281; Centralb. f. Physiol., Bd. xvii, S. 72.

⁵ Pflüger's Archiv, Bd. xcvi, S. 241.

⁷ Am. Jour. Physiol., vol. viii, p. 294.

⁶ Ibid., Bd. lxxxiv, S. 191.

⁸ Pflüger's Archiv, Bd. xciii, S. 246.

compounds which are not easily dissociated. [The possibility ought to be taken account of that an apparent antitoxic action may sometimes, or in some part, be due to the production of a change in the permeability of the cells to the toxic ions and not to an actual neutralization of their effects within the cell-protoplasm.]

NERVOUS SYSTEM.

Regeneration of Nerve-fibers.—[The question whether regeneration is possible in the peripheral end of a cut nerve independently of the growth of axons from the central end has given rise to a considerable amount of discussion.] J. N. Langley and H. K. Anderson¹ find that, as a matter of fact, such regeneration may take place without any connection being formed with the central stump. But such regenerated fibers degenerate when the nerves that run to the tissue surrounding the peripheral portion of the nerve are cut. Therefore the regeneration is not independent of the central nervous system. When the peripheral ends of two sensori-motor nerves are sutured together, no contraction takes place in the muscles supplied by one of them when the other is stimulated. But when the muscular branch of the crural nerve is divided and permitted to grow both into its own peripheral end and into the peripheral end of the internal saphenous nerve, stimulation of the saphenous nerve may cause reflex contraction in the muscles supplied by the muscular branch of the crural. This is still obtained after section of the crural close to the vertebræ, and is therefore to be considered as an axon reflex.

Spinal Paths.—**The dorsal spinocerebellar tract.**—C. S. Sherrington and E. E. Laslett² point out that in this tract there is a definite stratification of the fibers: the fibers from the segments furthest back in the cord lie outermost; beneath these come fibers from the lowest thoracic segments; then the fibers from thoracic segments further forward; and, internal to all, the fibers from the topmost thoracic and lowest cervical segments.

The Sensory Spinal Paths.—J. Dejerine³ takes the opportunity, in publishing a report of the symptoms and pathologic findings in a case of hematomyelia, to review the evidence (which he considers convincing) that the sensory localization in the cord is not segmental but radicular. As regards the motor localization in the cord, L. Rosenberg⁴ states that in a case of amputation at the junction of the middle and lower third of the forearm, Nissl's method revealed distinct degeneration in the antero-external cell-group from the sixth cervical to the first dorsal segment of the cord, which corresponds to the localization of Edinger and Bruns.

Spinal Reflexes.—C. S. Sherrington and E. E. Laslett⁵ have made important studies on the paths of the spinal reflexes. Among the most interesting results is the demonstration that in the mammal the reflex irradiation in the cord spreads tail-wards as well as head-wards, in opposi-

¹ Proc. Physiol. Soc., Dec. 13, 1902; Jour. of Physiol., vol. xxix, p. iii.

² Jour. of Physiol., vol. xxix, p. 188.

³ Jour. de Physiol. et Path. gén., tome v, p. 657.

⁴ Neurol. Centralb., Bd. xxi, S. 742.

⁵ Jour. of Physiol., vol. xxix, p. 58.

tion to Pflüger's fourth law of spinal conduction in the frog: viz., that the irradiation spreads always in the direction of the medulla oblongata. For instance, afferent channels from the skin of the shoulder are freely connected with efferent paths to the muscles of the hips, knee, and ankle by an uncrossed path descending the lateral column. Sherrington¹ further shows that the different kinds of sensory end-organs in the same region of the skin possess different reflex spinal connections.

Cerebellum.—S. Kreuzfuchs² has estimated the total surface of a human cerebellum at 84,246 sq. mm. The cerebellum was cut into serial sections, which were projected, and the edges measured. Although the cerebrum is 8 to 9 times heavier than the cerebellum, its surface is only 2.2 to 2.6 times greater.

M. Lewandowsky³ from experiments on more than 100 animals (dogs and monkeys) deduces the conclusion that the cerebellar ataxia is a sensory ataxia. It depends on a serious disturbance of the muscular sense, in consequence of which the power of graduating movements is lost. When the cerebellum is intact and the cerebral hemispheres are absent, the sensations of the muscular sense, acting in the cerebellum, are sufficient to regulate those movements which take place with a lower degree of consciousness than those governed by the cerebral hemispheres.

Internal Ear and Equilibration.—G. v. Marikovsky⁴ states that in pigeons and rabbits the reflex excitability to induced currents is diminished in the extremities and ears after extirpation of both labyrinths, but not after plugging the semicircular canals (in pigeons) by Ewald's method, which does not destroy the nerve-endings, although it prevents the streaming of the endolymph and perilymph. The end-apparatus of the labyrinth therefore stands in relation with the reflex excitability of the limbs and ears on the opposite side. In confirmation of the conclusions of Högyes and Ewald, extirpation and plugging of the labyrinth cause practically the same interference with combination of movements.

SPECIAL SENSES.

M. Wien⁵ has elaborately investigated the question how the sensitivity of the ear varies for tones of different pitch. He finds that a tone of 50 vibrations a second, in order to be just heard, must have an intensity corresponding to about 100 million times as much energy as is needed for a tone of 2000 vibrations. It is only on the extraordinary sensibility of the ear for the range of tones used in ordinary speech that the possibility of understanding speech depends under unfavorable circumstances, at a great distance, *e. g.*, or in the presence of much stronger accompanying noises.

Nasal Taste.—H. Zwaardemaker⁶ has re-investigated the phenom-

¹ *Ibid.*, vol. xxx, p. 39.

² *Arb. a. d. neurol. Inst. zu Wien*, ix, S. 274; *Centralb. f. Physiol.*, Bd. xvii, S. 110. ³ *Arch. f. Physiol.*, 1903, S. 129.

⁴ *Pflüger's Archiv*, Bd. xciv, S. 449; *Ibid.*, Bd. xcvi, S. 284.

⁵ *Pflüger's Archiv*, Bd. xcvi, S. 1.

⁶ *Archiv f. (Anat. u.) Physiol.*, 1903, S. 120.

enon, first described by himself¹ and by A. Rollett,² that the vapor of chloroform causes a sweet taste when aspirated in not too small an amount through the nose. Gradenigs³ has found that after anesthetizing the gustatory elements in the oral cavity and pharynx by gymnemic acid the nasal taste of chloroform is not abolished. Zwaardemaker suggests that the elements concerned may be the epithelial buds discovered by Disse in the *regio olfactoria*. It is in favor of the view that the elements excited, whatever they are, are different from the olfactory elements, that the threshold value of the excitation both in the case of chloroform and ether is widely different for nasal taste and for smell.

MISCELLANEOUS.

S. Hatai⁴ states that the growth of white rats is greatly stimulated by lecithin given either subcutaneously or by the mouth, the gain of weight being on the average 60 % in the lecithin-fed rats as compared with the controls, thus confirming the results of Danilewsky,⁵ and of Desgrey and Zaky.⁶

H. Stassano and F. Billon⁷ have shown (also in confirmation of Danilewsky) that the erythrocytes are increased in number after intravenous injection of lecithin, the increase running parallel with the increase in weight of the animal.

Radium Rays.—G. Bohn⁸ finds that these rays affect the growth of the larvae of the frog and toad, either hindering or favoring it according to circumstances. J. Danysz⁹ states that the radium rays cause wounds in the skin, which appear 8 to 20 days after exposure. Insect larvae are paralyzed after 24 hours' exposure, and anthrax bacilli cannot develop. S. Exner¹⁰ and G. Holzknecht and G. Schwarz¹¹ have investigated the phosphorescence produced in various animal tissues by exposure to radium rays. The lens of the eye has the strongest phosphorescence, but muscle and other tissues also exhibit it.

A. P. Mathews and B. R. Whitcher¹² have shown that mechanical shock affects in a remarkable manner the development of *Arbacia* eggs, thus confirming Meltzer's view¹³ of its important action on the tissues.

¹ Ned. Tijdschr. voor Geneeskunde, 1899, Deel i, p. 113.

² Pflüger's Archiv, Bd. lxxiv, S. 383.

³ Congress zu Rom, 1899; Zeit. f. Ohrenheilkunde, Bd. xxxvii, S. 66.

⁴ Am. Jour. Physiol., vol. x, p. 57.

⁵ Compt. rend., tome cxxi, p. 1167; tome cxxxiii, p. 195.

⁶ Ibid., Jour. de Physiol. et Path. gén., tome iv, No. 4.

⁷ Compt. rend., tome cxxxiv, pp. 318, 430; Compt. rend. de Soc. de Biol., tome liv, pp. 156, 158; Centralb. f. Physiol., Bd. xvi, S. 81.

⁸ Compt. rend., tome cxxxvi, p. 1012.

⁹ Ibid., p. 461; Centralb. f. Physiol., Bd. xvii, S. 145.

¹⁰ Centralb. f. Physiol., Bd. xvii, S. 177.

¹¹ Sitz. d. Ges. d. Aerzte in Wien., Wien. klin. Woch., June 18, 1903.

¹² Am. Jour. Physiol., vol. viii, p. 300. ¹³ Zeit. f. Biol., Bd. xxx, S. 3.

LEGAL MEDICINE.

By JOHN MARSHALL, M.D., NAT. SC. D., AND JOHN H. W. RHEIN, M.D.,
OF PHILADELPHIA.

GENERAL SUMMARY.

WHILE there has been very little that is new in the literature of legal medicine during the past year, there have been a number of interesting and instructive publications with which the general practitioner should be familiar.

Along the lines of insurance a valuable suggestion has been made, that physicians should study with care the character of their accident policies in order to avoid the possibility, in case of accident, of forfeiting claims to indemnity by reason of technical faults in the wording of their policies.

Physicians who are using the *x*-ray for diagnostic or therapeutic purposes are cautioned against the possibility of suits for malpractice. When they contemplate using the *x*-ray either for therapeutic or diagnostic purposes, the patients should be made to sign a release in case of accident arising during its use. A careful explanation of the possible dangers of the *x*-ray should always be made to the patient, preferably in the presence of a witness, before he is treated. Those who are called upon to give expert evidence upon questions relating to *x*-ray work should be familiar with the recent cases in which the *x*-ray pictures have been admitted in evidence.

A paper by Frank T. Lodge (Detroit) on the personal injury question will be interesting to the expert, who will find many valuable, if not flattering, suggestions.

Theodore Sutro has clearly defined the position which should be taken regarding the doctrine of survivorship in the case of two or more deaths in a common disaster.

There have been many interesting cases of poisoning reported in the past year. W. S. Magill reports an unusual case of aconite poisoning, and describes a new method of determining the toxicity of aconitin by chemical analysis.

A number of fatal cases of poisoning by wood alcohol recently have brought to notice the fact that this drug is more fatal than ethyl alcohol, and also that it causes optic neuritis. Methyl alcohol, on account of its cheapness, is used in the manufacture of varnish, bay rum, Jamaica ginger, and similar preparations. On account of its unusual toxicity it would

seem advisable that all preparations containing it should be marked "poison."

John Reid describes an unusual condition of the red blood-corpuscles in arsenical neuritis. He found in 2 cases that the hemoglobin was collected in beads along the edge of the erythrocytes. Buscher reported certain somewhat revolutionary conclusions about the value of ferric hydroxid in arsenical poisoning, and claims that this formerly recognized antidote is useless. Of great interest in the medicolegal question of poisoning by arsenic are the publications by Bertrand, who claims to have proved that arsenic is a fundamental element of the living organism.

The 3 cases of tartar emetic poisoning published by Thomas Stevenson will be of special interest to toxicologists. Poisoning by this drug is rare nowadays.

Hirschlaff was able to produce a protective serum which was effective against opium poisoning in animals. He reports a case of opium poisoning in a man in which the results were encouraging, though not conclusive.

J. B. Mattison criticizes severely the hyoscin treatment of the opium habit.

Those who have been using heroin extensively as a substitute for morphin should not forget that it is possible to produce the heroin habit.

There have been cases reported in which one afflicted with epilepsy has committed murder during an epileptiform seizure, and the true character of such cases has been recognized by the court. But whether the mind deteriorated by epilepsy to the point of committing a crime is or is not responsible for the acts which it dictates is another question, and one that is yet far from having a satisfactory legal solution. At present the courts, with some exceptions, maintain that the test of responsibility is the capacity of one to decide between right and wrong at the time of the commission of the crime. The criminal responsibility of the epileptic is a subject of real medicolegal importance, and is closely bound up with the question of the legal responsibility of murderers in general.

The value of the antiserum test has been demonstrated in a legal case by Patek and Bennett, who recognized by this method blood-stains upon wood, cloth, paper, and glass. Layton claims that human blood can be differentiated from monkey's blood, and believes the test is applicable to forensic use. The serum should be fresh, as it has been demonstrated by Robin that when kept for 4 weeks it loses its specificity.

Every physician should be familiar with the possibilities as to malpractice. If conscience and duty are insufficient to stimulate the practitioner to constantly do his best, the law insists upon it, and holds him responsible for damages if he performs less than the best he is able to do. The courts do not even countenance the possibility of human error. A patient can recover damages for physical pain or deformity which result from the fault or carelessness of a physician.

Much has been written about the subject of expert testimony. At present many evils have developed in trials on account of the fact that

experts on both sides with equally excellent reputations can be found who will testify to diametrically opposite opinions. In consequence of this, jurors have come to look upon the testimony of experts with increasing suspicion and distrust. If experts were really honest, there is no reason why this should be so, and until it is possible to obtain honest expert testimony there will continue to be grave miscarriages of justice both for the defendant and for the plaintiff.

A review of the criminal statistics shows that crime is increasing. It is shown also that abuse in the use of alcohol is an important factor. In the United States, statistics point clearly to the fact that crime is more common among colored than among white people.

DEATH AND THE DEAD BODY.

William P. Lane, M.D.,¹ a member of the Detroit Bar, discusses the question of **necropsies from the medicolegal standpoint**. He emphasizes the importance of performing postmortem examinations of legal interest with great care and thoroughness, so that at the trial of the accused the counsel cannot raise a "reasonable doubt" as to the character of the examination. In making examinations in which the viscera are retained for chemical analysis, the chemist should be present during the entire examination, so that there would be no break in the chain of evidence from the moment at which the examination was made to the time the chemist was placed upon the stand. He calls attention to the importance of sealing the different viscera in absolutely clean, separate jars. He refers to the difficulties that experts encounter when endeavoring to recognize fragments of bone which remain after a body has been exposed a long time above ground or under ground, or to recent incineration, or to rapid corrosion and destruction of the softer parts by caustic solutions, and quotes instances in which grave mistakes have been made by experts in such cases. He does not believe that any expert can definitely state what part of the body strikes first when a person alights from a moving car. He believes that expert testimony should be the result of conscientious and faithful work and investigation on the part of the expert, and that the latter should be honest and frank enough to confess ignorance on a subject about which he is not qualified to answer.

R. L. Leak,² in an analysis of 560 autopsies, found death in 5 instances due to **rupture of the heart**. The ages of the patients ranged from 62 to 81 years, and in all the cases the arteries were fibrous, in 2 cases calcareous. Before the rupture the pulse was 72 to 120, while irregularity was noted in only 1 case. Hypertrophy of the heart was present in 2 cases, in 1 there was a systolic murmur, and in 2 the heart was normal. The hearts weighed respectively 9, 9½, 10½, 13, and 17 ounces. The rupture in 4 cases was of the left ventricle, and in the other of the right auricle. Microscopically in one case there was fatty degeneration; in another case brown atrophy, granular degeneration, and cell frag-

¹ Physician and Surgeon, July, 1902, p. 303.

² Amer. Med., Sept. 6, 1902.

mentation; in a third case a somewhat similar condition; but in 2 cases there was no change.

Poirault¹ believes that a **sudden blow upon the abdomen or larynx, or irritation of the uterus** provoked by abortions or obstetric conditions, **can bring about sudden death** in cases in which autopsy will reveal no lesions capable of explaining death. In such cases there is a sudden arrest of the functions of the heart and respiration following a peripheral excitation due to inhibition. Death in certain cases of drowning in which the findings at the autopsy are negative is due to this mechanism. He believes that in those individuals who succumb under these circumstances there existed a susceptibility favored by certain conditions in which the digestive period plays an important part. These facts have a medicolegal importance. He concludes that when the postmortem records are negative, and the circumstances of death are well known, it is justifiable to conclude that death is due to inhibition.

INSURANCE.

A census report made by the "Insurance Press"² shows that **deaths due to accidents and injuries occur more frequently among those whose mothers were born in Italy** (119.5 per 100,000 of the white population). The number was 62.7 per 100,000 in children of mothers born in the United States. The death-rate from accidents and injuries is highest in persons over 45 years of age. The average age is about 33.5 years. In the Cordilleran regions, the Pacific coast regions, and the Western plains the proportion of deaths from accident and injuries was highest. It was least in the northern Atlantic coast region, the middle Atlantic, and the northeastern hills and plateaus. There are more fatal accidents in the warm months than in the cold. There are more deaths from accidents than from any other cause with the exception of tuberculosis, pneumonia, and heart disease. The liability to die from accident is twice as great as from old age.

The Court of Appeals at St. Louis³ holds, in the case of Kellar vs. Home Life Insurance Co., that a **waiver accepted by the insured, that the provisions of law whereby a physician is forbidden to disclose information acquired while attending him, is binding on the beneficiary in a suit on the policy**; that the trial court was in error when it excluded testimony pertaining to the state of health of the insured by physicians who were in attendance upon him shortly before his application.

The physician should **study carefully and understand the policies which are supposed to cover disability or death from infection following accidents occurring during their professional work.**⁴ Many policies are issued in which the wording is such that it admits of indemnity only when infection occurs through a wound received during operation upon a person other than the physician himself. In other

¹ Jour. de Méd. de Paris, April 9, 1903. ² Jour. Am. Med. Assoc., April 4, 1903.

³ Jour. Am. Med. Assoc., Sept. 6, 1902. ⁴ Editorial, in Clin. Rev., Sept., 1902.

words, he has no claim unless in the same case he is at once wounded and infected. If a previous abrasion is wounded this does not give him any claim to indemnity. Again, if a surgeon operates upon 2 or 3 persons during the day, and cannot state absolutely from which patient the infection occurred, the company may refuse to recognize his claim.

A man carrying an accident insurance policy ate some unsound oysters which caused his death by lodging in the lower part of the stomach and producing inflammation of the intestinal tract and mucous membranes, which resulted in the enlargement of the same, the blocking of the bowels, and thus an intestinal obstruction.¹ It was claimed by the company that the policy did not cover death from injuries resulting "from poisoning, or anything accidentally or otherwise taken, administered, absorbed, or inhaled"; that the oysters were eaten voluntarily, consciously, and intentionally, and that therefore they were not accidentally taken. The Court of Civil Appeals of Texas decided against the company, stating that while the insured knowingly ate the oysters, he did not know at the time that they were unsound, and that the result was not anticipated or foreseen by him.

X-RAY IN FORENSIC MEDICINE.

The Supreme Court of Nebraska, in the case of City of Geneva vs. Burnett,² decided that **x-ray pictures are admissible in evidence** to show the condition of the internal tissues of the body. A thorough explanation of the taking of the pictures, as to time, manner, and circumstances, was made, and also the condition of the injured foot which the pictures were intended to represent. The city claims that this was secondary evidence, and was therefore not admissible, but the Supreme Court claimed from the testimony of witnesses that aside from a surgical operation, the *x-ray* picture gives a better idea of the condition of the internal tissues of the foot than any other method.

The Supreme Court of Nebraska states, in the case of Carlson vs. Benton and others, that **an x-ray photograph may be introduced as evidence**, whether it is shown that it was taken by a competent person or not, or whether the condition of the apparatus and the circumstances under which it was taken show an accurate picture or not, if the evidence of competent witnesses proves that the photograph represents the object it was claimed to represent.³ The trial judge has not absolute discretion in the reception of such evidence, and when it is shown that the photograph is an accurate one by the evidence, it is an abuse of discretion to exclude it on the ground that sufficient foundation has not been laid. The same rule applies to the *x-ray* photograph as to maps, photographs, drawings, or models.

¹ Jour. Am. Med. Assoc., May 16, 1902.

² Jour. Am. Med. Assoc., Aug. 23, 1902.

³ Jour. Am. Med. Assoc., Feb. 14, 1903.

MISCELLANEOUS.

Frank T. Lodge¹ (Detroit) discusses **both sides of the personal injury question.** He calls attention to the rapid growth in the number of claims for damages for personal injuries during the last 25 years, which he believes is due to the growing concentration of the population in the cities, together with the complex life, the massing of machinery, the rush of travel, the development of rapid transit, and the manifold dangers that attend a complex civilization. He mentions the fact that in certain places the size of the verdicts is increasing rapidly, and lays down as a conspicuous fact that while formerly the defendant had little chance before a jury, that cannot be said to be true any longer. Until recently the facts show (1) that a claim for personal injuries is most likely to end in favor of the defendant; (2) that the damages will be large; (3) that the Appellate and Supreme Courts of Illinois, Kansas, Texas, and Indiana at least are more greatly to be feared than the plaintiff. He then discusses this question from **the standpoint of the defendant**, and shows how the prosecution suits for injury is a business in itself. There are lawyers whose practice is devoted to this class of cases alone, who have their runners or "snitches," and who take these cases on a speculative basis. The lawyers, surgeons, witnesses, and "snitches" all share in the profits, while the injured persons receive but a small share. The author brands this system as fraudulent throughout. He refers to the cases in which the symptoms of the victims in the hands of dishonest surgeons become aggravated for the purpose of magnifying the injury. He looks upon the frauds of the "snitches," lawyers, claimants, physicians, and experts as possessing great danger to the defendants. He believes that many so-called experts become part of a conspiracy to misrepresent, and to maintain claims for injury which would never be sustained. Discussing the question from **the standpoint of the plaintiff**, he criticizes the methods of large railroads, who induce victims of accidents to sign full releases for small sums, when the injury should be compensated for by thousands. Many claimants of damages are handicapped by being represented by ignorant lawyers. Corporations have descended to resort to fraudulent and criminal methods to win their cases, and engage persons who act as spies, or even stoop to bribery. The only remedy for these abuses is honesty all along the line.

Theodore Sutro,² President of the Society of Medical Jurisprudence, discusses **the doctrine of survivorship in the case of two or more deaths in a common disaster** apropos of the Fair accident in France. He reviews the provisions of the Roman law, the status of this question in the United States and England, and then states his opinion as to which is the preferable system. The Roman or civil law, published A. D. 533, maintained that in the case of a father and son dying together in a battle or shipwreck, the son outlived the father if he was above the age of puberty, but died first if under this age. Of persons over 60

¹ Physician and Surgeon, July, 1902.

² Med. Rec., Feb. 28, 1903.

years dying together, it is presumed that the youngest survived; or if under 15 years, the oldest survived. If the question rested between males and females, the presumption was that the male survived. In the Code Napoleon in France practically the same principles existed. The same rule is followed in Italy, Spain, and Greece. In Prussia, Austria, and Holland the presumption is that death was simultaneous. In this country only in Louisiana and California are found the same principles that exist in France. In England the law is opposed to any presumption of survivorship, and insists that any claim of survivorship shall be proved. This same principle is carried out throughout the United States with the exceptions above stated. Chief Justice Fuller expressed in a recent case the following opinion: "The rule is that there is no presumption of survivorship in case of persons who perish by a common disaster in the absence of proof tending to show the order of dissolution, and that circumstances surrounding the calamity of the character appearing on this record are insufficient to create any presumption on which the courts can act. The question of actual survivorship is regarded as unascertainable, and descent and distribution take the same course as if the deaths had been simultaneous." Sutro concludes that nothing but an arbitrary rule can be arrived at in this matter, and believes that the most logical rule would be the presumption that, in an accident in which it was important to decide which of the several persons survived, all perished together, unless there is distinct evidence relating to the circumstances of the accident.

Franklin B. Mall¹ studied a collection of human embryos in the laboratory of the Johns Hopkins University with a view of determining the **method by which the age of the embryo may be estimated**. Pursuing the embryologist's method, he obtained the following results: Embryos 1 mm. long are 12 days old; embryos 2.5 mm. long are 14 days old; embryos 4.5 mm. long are 19 days old; embryos 7 mm. long are 26 days old; embryos 11.5 mm. long are 34 days old; embryos 17 mm. long are 41 days old. In embryos from 1 to 100 mm. long, if the length of the embryo from the vertex to the breech in millimeters be multiplied by 100, and the square root be extracted, the result will be its age in days. The length in millimeters in embryos from 100 mm. to 200 mm. long from vertex to breech equals their age in days.

A. F. Chamberlain² suggests, as a **remedy to the contests of wills** and their varying interpretation and apparent inconsistencies, that each State establish a court or other properly constituted body which shall consider and validate the will during the testator's life, after which the document shall be deposited, and would thus become a properly constituted instrument. Secrecy could be observed when necessary. This validation regarding the will should prevent any contest of the will after the death or incapacity of the testator.

G. G. Taylor³ is a firm believer in **vivisection** when the experimenter is a skilled anatomist and physiologist, when anesthesia is employed

¹ Bull. Johns Hopkins Univ., Feb., 1902.

² Science, March, 1903, p. 391.

³ Chicago Med. Recorder, Oct., 1902.

whenever possible, and when the experiment is not purely a repetition from which no new facts can be gained. The abuses of vivisection are, he believes, the infliction of unnecessary or excessive pain; the needless multiplication of experiments which are painful, or which are performed without anesthesia or with only partial anesthesia or with pseudoanesthesia. He does not believe that experiments should be done to determine the effect of pain upon the various functions of the body. He does not believe in painful experiments which are used for demonstrating to classes nor those for the purpose of confirming an established theory. He criticizes the subsequent care of animals after experimentation. The remedy for these evils is not suppression but regulation. The law should be national. A State commissioner should be given the privilege to license vivisection under certain restrictions, and he suggests that men of good moral character might be given a yearly license to perform vivisection, and should be held responsible for any carelessness or cruelty, to be punished by both fine and imprisonment.

MEDICAL JURISPRUDENCE AND LEGAL DECISIONS UPON MEDICAL QUESTIONS.

The Supreme Court of Maryland, in the case of the Western Union Telegraph Co. vs. Church,¹ confirms judgment against the company for **\$950 damages for failure to deliver a telegram promptly to a physician.** The telegram contained a message summoning the physician to see a patient. It was not delivered until 3 hours after it was given to the company for transmission, and in the meantime a child had been born to the patient by a foot presentation, resulting in the death of the child.

The Court of Appeals at Kansas City, Mo., in the case of Nickel vs. Columbia Paper Stock Co.,² decided in favor of the suing party, who claimed damages against the company for **injuries to her health resulting from poisoning obtained while sorting old papers and rags** for the company, which had been gathered from some hospital. The sack which was dumped upon the table where she was working contained pieces of decaying flesh and cotton soaked with blood, urine, and various medicines. The court claimed that while the plaintiff undoubtedly assumed the ordinary risks of injury which would reasonably result from the character of her employment, the company was not exculpated from the responsibility of placing upon her table poisonous materials gathered from a place where such materials might be expected to be found.

Justice Lount³ ruled that a **child in utero is a child in law**, and possesses the same privileges as one living at the death of the parent. A farmer in Ontario died leaving a widow and 4 children, and 4 months later a fifth child was born. He left an insurance policy of \$2000 which was to be turned over to the widow and children in equal shares. The

¹ Jour. Am. Med. Assoc., July 19, 1902.

² Jour. Amer. Med. Assoc., July 19, 1902.

³ Canad. Jour. of Med. and Surg., Sept., 1902.

administrator had some doubt as to whether the fifth child was entitled to a share of the insurance money, and applied to the court for advice. It is stated that there is only one other such case on record.

D. P. A. Jacoby¹ reports the **first case of conviction for criminal abortion in the State of Rhode Island**. The defendant, Cecilia Smith, had been tried in 1889, but was not convicted because it was shown that the victim of the alleged abortion died as the result of hemorrhage from the stomach due to an old ulcer, together with a subphrenic abscess due also to the ulcer. The case which led to the conviction was that of a woman who died in the hospital, where she underwent thorough cleansing of the uterus rendered necessary by the retention of the placenta after the abortion was performed.

The revised statute of Ohio² is amended by an Act of the Laws of Ohio of 1902, which provides that **when a person uses the word or term "Dr.,," "Professor," "M.D.,," "M.B.,," or any other title which would induce the belief that the person employing the term is engaged in the practice of medicine, surgery, or midwifery, it shall be accepted as prima facie evidence that such a person is actually engaged in the practice of medicine, surgery, or midwifery.**

M. D. Leighton³ has analyzed a number of court verdicts in order to determine the **monetary value of human life**. He eliminates from the records the decisions in those States which allow punitive damages and which have set a limit to the amount recoverable in case of death. In 147 cases among males, all of which were passed upon by the Supreme Court and Courts of Appeal, it was shown that the value of life increased from infancy to puberty, and then remained stationary to 20 years of age, when the value rapidly rose to 30 years of age. After this there was a slow decline to the age of 55 or 60 years, when the value rapidly declined.

The Court of Appeals of Colorado, in the case of the Mutual Benefit Association vs. Nancarrow,⁴ held that the words "**totally disabled**" and "**confined to the house**" do not necessarily mean that one sustaining an accident shall be reduced to a state of absolute helplessness, or that he shall be absolutely confined to his house. The court claims that one may be sick and yet able to move about and occasionally go outside of the house temporarily. In the case of Nancarrow the insured was confined to the house with the exception of those times when he went to the physician's office on the cars, and the court believes that this amount of confinement answered the necessary requirements of the policy.

The Supreme Court of Minnesota, in the case of Monahan vs. The Columbian Knights,⁵ held that **total and permanent disability does not necessarily mean that the person shall be disabled to such an extent that he is unable to perform some easy occupation or some slight service**. The court states that "**following any occupation**

¹ Providence Med. Jour., 1903, No. 2, p. 57.

² Jour. Am. Med. Assoc., 1902.

³ Pop. Sci. Monthly, June, 1902, p. 120.

⁴ Jour. Am. Med. Assoc., March 14, 1903.

⁵ Jour. Am. Med. Assoc., 1903, p. 603.

means something more than the doing of one or more acts pertaining thereto." It involves the idea of continuity, and the doing of things which are essential in a work or business in which a person may be occupied. In other words, one is not able to follow his occupation if he is incapacitated from doing all of the essential acts of that occupation.

The Second Appellate Division of the Supreme Court of New York, in the case of Waldie vs. The Brooklyn Heights Railroad Company,¹ awarded \$10,000 damages to a Sandy Hook pilot who sustained an accident which resulted in permanent disability, as a result of which he lost his position, which paid him an income of \$125 a month.

The Court of Appeals of Kentucky, in the case of Barrett vs. City and County of Henderson,² affirms judgment in favor of the city and county in an action brought to recover damages for alleged depreciation of property on account of its location near a pest-house. The value of the property had decreased, it was shown by a number of witnesses, \$20 to \$30 an acre. The city and county introduced a witness who had known the ground all his life and who testified that it was as valuable as ever.

The Supreme Court of Rhode Island, in the case of Commings vs. The National and Providence Worsted Mills,³ did not think that \$12,500 was an excessive amount to be paid to a man who, by reason of an accident, suffered total loss of vision in one eye and partial loss of vision in the other, with the possibility of total blindness in the near future.

A verdict of \$100,000⁴ was awarded to the widow of a man who was killed in the Park Avenue Tunnel accident in New York city. She sued the New York Central and Hudson River R. R. Co. for \$250,000, claiming that her husband was making \$35,000 a year. She was allowed also \$2000 for counsel fees.

The Court of Appeals of Kentucky, in the case of the Louisiana and Nashville Railroad Co. vs. Reynolds,⁵ decided in favor of the plaintiff, by which the latter was given \$9166.66 for loss of time which resulted from incapacity occasioned by an injury. The court instructed the jury that the physician could show the amount which he was earning at that time, and during that particular part of the year at which time he was incapacitated.

The Supreme Court of Illinois⁶ permits the reading of a work in court in order to contradict a statement made by an expert who bases his opinion upon the statements of its author.

MALINGERING AND HYSTERIA.

Charles Aldrich,⁷ in discussing the question of paralysis and damage suits, believes that careful investigation will always reveal the most successful malingerer. In deciding whether paralysis is simulated, it

¹ Jour. Am. Med. Assoc., March 14, 1903.

² Jour. Am. Med. Assoc., Dec. 6, 1902.

³ Jour. Am. Med. Assoc., Dec. 20, 1902.

⁵ Jour. Am. Med. Assoc., 1903, March 12, p. 279.

⁶ Jour. Am. Med. Assoc., April 11, 1903.

⁴ Medicolegal Bull., Jan., 1903.

⁷ Medicine, Dec., 1902.

is necessary to test the action of the rectal sphincter; to note whether the pulse-rate is increased when the tender spine is palpated; to observe whether the pupils dilate when pressure is made upon the painful spine. In deciding whether the bladder sphincter is paralyzed a sound should be inserted, whereupon if the sphincter is intact it will contract upon it. He believes that it is impossible for an increased knee-jerk or ankle-clonus to be simulated, and that the malingerer has no control over the cremasteric reflex.

Hoesslin¹ states that people who sue for damages after accidents, and **hysterical individuals simulating symptoms of disease**, are easily exposed. The case is one of hysteria if, combined with other symptoms of this disease, the tubular visual field is present; but if symptoms of hysteria are absent, he believes the individual is probably a malingerer. If paradoxical contractions of antagonistic muscles exist, the case is one of malingery. Certain motions performed by the patient are resisted slightly and then the resistance is suddenly relaxed. In perfectly healthy individuals, or in one affected with organic disease, the limb will jump in the direction of the attempted exertion, but in malingery the limb will remain in the same position. In 37 individuals in whom Hoesslin found this phenomenon present, further examination showed that they were all malingererers. In cases in which the paradoxical contractions were absent the injury proved to be of an organic nature even although hysterical symptoms were present.

The Supreme Court of Washington, in the case of Sawday vs. Spokane Falls and Northern Railway Company,² decided that the **company is liable for the malpractice of its surgeon** if it contracted for a consideration to treat the employees of the railroad for the injuries sustained during service for the road.

The Supreme Court of California³ affirmed the judgment of a lower court which **sentenced a physician who was found guilty of manslaughter to 10 years' imprisonment** in the State prison. A pregnant woman expired while the physician was cureting her womb, and it was claimed by the prosecution that the physician knew that the woman was pregnant, and that the operation was done for the purpose of producing a criminal abortion. The physician claimed that he had not understood the patient's condition; that she had concealed the fact of her pregnancy from him; and that he had made a diagnosis of endometritis, the recognized cure for which is cureting. Expert testimony went to show that the accused should have discovered the condition of the patient if a proper examination had been made. There was also some evidence that preliminary precautions to prevent any possible accident during operation had been neglected. The judgment of manslaughter acquitted the physician of the crime of criminal abortion, and went to show that he had caused the death of the patient by want of due caution and circumspection in attempting an operation which he had thought was necessary.

¹ Münch. med. Woch., Sept. 16, 1902. ² Jour. Am. Med. Assoc., Jan. 31, 1903.
³ Jour. Am. Med. Assoc., Nov. 15, 1902.

The **Laws of Ohio of 1902 prohibit**—under penalty of a fine of not more than \$500 nor less than \$50—any one **selling, bartering, or giving away cocaine** except when prescribed by a licensed physician.¹ The Act provides that any package containing cocaine shall be marked “poison” on the label or the wrapper; and the sale of such must be registered in a book kept for such a purpose, in which shall be inscribed the date of the sale, the name and address of the physician prescribing the drug, the quantity of the sale, and the name, age, sex, and color of the person to whom the drug is sold, the purpose for which it is prescribed, and the name and residence of the person who is to use the drug. This Act does not apply to wholesale dealers.

The Grand Jury of Chicago² investigated the question of the sale of dangerous drugs, and came to the conclusion that there was an **alarming growth in the sale and use of cocaine**. This drug was dispensed by druggists in Chicago and other parts of Illinois without a physician's prescription. They recommended that the legislature and the police should assist in the breaking up of this dangerous practice. It appears from a study of this subject that the cocaine habit is undoubtedly increasing in this country, and often arises from the endeavor on the part of one suffering from dyspepsia, neuralgia, and various other ills and pains, to alleviate his sufferings or discomforts by means of drugs such as cocaine. Laws against the sale of drugs and of patent medicines containing the same are needed everywhere.

TOXICOLOGY.

In the autumn of 1902 a bill was introduced into the New South Wales Legislative Assembly,³ the object of which was to amend the **“Poisons Act”** in such a way as to facilitate the selling of patent medicines by storekeepers, without insisting upon their obtaining a “poison license.” The Poisons Act makes it necessary for a country resident to travel a number of miles to obtain the patent medicine from the chemist, which the local storekeeper could readily supply if it were not necessary to procure a poison license. This was one of the objections to the Act offered by a deputation which waited upon the Premier, seeking his support in the passage of a bill of amendment. But there are weighty arguments against interfering with the present Act, the main object of which is to make it difficult for the public to get possession of strong poisons. Some proprietary medicines may in themselves be perfectly harmless in the doses prescribed, but if, as is often the case, the dose is not adhered to, harmful results may ensue. Then, too, patent medicines are not always harmless, as some contain poisonous alkaloids. While it is impossible to prevent the public from buying patent medicines, at the same time it is unwise to take away all obstacles to the indiscriminate sale of poisonous compounds. The editor believes that the Act should be amended in the opposite direction, and the sale

¹ Jour. Am. Med. Assoc., Oct. 4, 1902.

² Editorial, in Med. Rec., April 18, 1903.

³ Australasian Med. Gaz., Dec., 1902.

of such poisons as carbolic acid, arsenical and phosphorus rat pastes should be even more restricted than at present. The more difficult it is to purchase deadly poisons, the fewer cases of accidental or criminal poisoning will occur.

James Davidson¹ reports a fatal case of poisoning with naphtha vapor which occurred in a man of 24, who was employed in a rubber and guttapercha factory. It was his duty to dip the crude rubber in naphtha which was obtained from petroleum wells and subsequently refined. At the end of the day he was found unconscious, breathing heavily, with cyanosed face and lips covered with a white froth. The breath had a sweet, heavy odor similar to that of amyl nitrite. The pupils were slightly dilated, but responded to light, and the conjunctival reflex was present. The limbs were slightly rigid and the jaws tightly clenched. He was pulseless and his temperature was 98° F. In 2 hours he regained consciousness and later became restless and almost maniacal. He then vomited a greenish fluid, developed symptoms of double pneumonia at the base, and died 4 days after the accident. The necropsy showed consolidation of both lungs and demonstrated the presence of the diplococcus. The spleen was enlarged, and there were cloudy swelling in the liver and catarrhal changes in the kidneys. The heart and brain were nearly normal.

Frank G. Layton² describes a case of diachylon poisoning in a woman of 29, who had taken in the course of a week 1½ ounces of this drug. The symptoms consisted of constipation, headache, vomiting, epileptiform convulsions, and paresis of the external rectus muscle of the right eye. She was at times semiconscious only, and at one time vomited blood. Lead was not discovered in the urine until about a month after the ingestion of the drug. Under appropriate treatment the patient improved and a blue line which had appeared upon the gum almost entirely disappeared, as did also the ocular paralysis.

Two cases of fatal nickel-carbonyl poisoning occurred in the men employed at Mond's Chemical works at Clydach.³ Autopsy showed the presence of edematous and congested lungs, and fatty degeneration of the heart-muscle. All the organs, including the brain, were congested. Nickel-carbonyl is very volatile, boiling at 43° C. It is obtained from very finely powdered nickel-oxid over which hydrogen is first passed, and after the water has been removed from the nickel compound, carbon monoxide is brought into contact with the residue. When nickel-carbonyl is injected hypodermatically, it is found to be very poisonous.

L. Frazer Nash⁴ reports an interesting case of naphthalene poisoning in a boy of 13½ who ate by mistake a moth-ball about the size of a hazelnut. In a half-hour he suffered severe pains around the umbilicus, which extended to the nates. There was frequent micturition, which was painful owing to soreness down the urethra. The urine became brownish-yellow to black. Some time later he had several watery movements "mixed with a bright red" which he thought was blood. He was

¹ Brit. Med. Jour., March 7, 1903.

² Brit. Med. Jour., April 11, 1903.

³ Brit. Med. Jour., Jan. 24, 1903.

⁴ Brit. Med. Jour., Jan. 31, 1903.

in no other way incapacitated, although for 2 days he had severe headache and abdominal tenderness on pressure. Two days later there was suppression of urine for nearly 24 hours, but the urine, when passed, contained no trace of albumin and was perfectly clear. Four days later it is stated that he would have been perfectly well had it not been that he developed dry pleurisy, which was probably influenzal, although at no time was there a rise of temperature.

Thomas Oliver¹ reports 6 cases of **poisoning by the inhalation of sulfuretted hydrogen** in men who had inhaled this gas while excavating a caisson. Four of the cases were fatal. Nearby where the caisson was sunk there was a lot of refuse and tank waste from chemical works which had stood upon the spot, and when rain fell upon this waste, sulfuretted hydrogen was given off, and this passed into the caisson. Postmortem examination of the bodies showed rigor mortis, a marked degree of cyanosis of the face, and dark fluid blood. There was no abnormality of the abdominal viscera or other organs. The blood gave the spectrum of oxyhemoglobin. It is claimed by Labord that sulfuretted hydrogen kills by depressing the respiratory center in the medulla.

Gerold² claims that **when tobacco is macerated in a solution of tannin the nicotin and other injurious active principles are neutralized.** It is afterward dipped in a decoction of *origanum vulgare* which restores the perfume of the tobacco. It is claimed that in this way the toxic action of the tobacco is greatly reduced and that its use is thus rendered almost innocuous.

Rudolf Kobert³ reports a case of **poisoning by oxalic acid** in a man who took a large quantity of this drug with suicidal intent. The results were fatal in 10 minutes. The mouth, esophagus, cardiac portion of the stomach and upper part of the small intestine were eroded. The kidneys were congested. The blood in the heart was fluid and remained so for 8 days. It could be made to coagulate when calcium chlorid was added. Microscopically calcium oxalate crystals were found in the blood, but none in the small intestines or kidneys.

Wightwick and Rolleston⁴ report a case of **acute trional poisoning** in a woman of 29 who took for insomnia 125 grains of trional in tablet form. In about an hour she felt faint and giddy and fell to the floor unconscious. When seen by Wightwick an hour and a half later, she was breathing heavily and slowly, was very pale, and almost pulseless. The first sound of the heart was feeble, the extremities were cold, the knee-jerks and conjunctival reflexes were absent. At first the pupils were dilated, but later they became somewhat contracted. Strychnin in doses of $\frac{1}{50}$ of a grain was given hypodermatically and hot water bottles were applied. The patient began to improve gradually, showing symptoms of impaired circulation and becoming dizzy upon attempting to walk or stand. The knee-jerks returned 4 days after the ingestion of the drug. The urine at no time contained albumin or showed any abnormality. Conspicuous in the treatment was the administration of purga-

¹ Lancet, Jan. 24, 1903.

² New Orleans M. and S. Jour., Jan., 1903.

³ Centralbl. f. innere Med., Nov. 15, 1902, p. 1138.

⁴ Lancet, April 18, 1903.

tives and sodium bicarbonate, with a solution of which the stomach was washed out. Attention is called to the general resemblance between the symptoms which followed the cumulative effect of trional and the ingestion of poisonous doses.

G. W. Holland¹ reports a case of **poisoning with oil of pennyroyal** in a married woman of 24, who took half a teaspoonful of this drug at one dose for the purpose of producing abortion. An hour after the ingestion of the drug she complained of great dizziness and nausea. Shortly afterward she vomited and had severe cramps and stiffness of the extremities. Consciousness then became lost, and soon she developed violent tonic contractions of all the muscles with opisthotonus of but a few minutes' duration. This was followed by incoherent talking, and in the course of a half-hour the toxic symptoms began to disappear and consciousness was recovered. The following morning the patient was practically well. There was no effect upon the uterine contents.

K. R. Dalal² reports a case of **chlorodyne poisoning in a boy of 18** who had taken 2.5 drams of this drug undiluted. The formula was unknown, except that 30 minims contained $\frac{1}{2}$ of a grain of morphin. When discovered the lad was unconscious and bathed in profuse perspiration. The temperature was lowered; the **pulse** could not be felt; the respirations were shallow and quick. The heart-sounds were feeble and fluttering, and percussion showed that the heart was dilated. The pupils were moderately contracted and equal and responded to light. Spirits of ether, digitalis, strychnin, caffein, and aromatic spirits of ammonia were given and coffee was injected into the rectum. The patient recovered.

Henry K. Dillard³ reports a case of **bromoform poisoning in a child of 18 months** who was given this drug for the relief of a cough. After the second dose of 4 drops given at 2 hours' interval the child was unconscious; had pinpoint pupils which did not react to light; the face was cyanosed; the lips partly open; the skin was cold and clammy; the breathing irregular and shallow; the pulse was 80, weak and irregular. The stomach was washed out and a soap-and-water enema given. Strychnin and atropin hypodermically and brandy and aromatic spirits of ammonia by the mouth were administered. Artificial respiration was practised and the child was given a cold bath. Four hours later the child suddenly became conscious, moved her arms, and appeared to be fully recovered. After sleeping at intervals during the following night she became again unconscious in the morning, but could be easily aroused. A few hours later, however, she was considered entirely recovered.

Gabriele Lamonaca⁴ describes a case of **poisoning by quinin** in a young man of 21 who had taken large doses of this drug for the relief of tertian malaria. The skin was jaundiced and the spleen enlarged, and he presented the symptoms of malarial cachexia. He had attacks of fever accompanied by bilious vomiting, tremors, and convulsive movements, with intense pain in the loins and the presence of hematuria. The author believes that the quinin had transformed the disease into an

¹ Am. Jour. Med. Sci., Jan., 1903.

² Med. Rec., June 20, 1903.

³ Brit. Med. Jour., May 16, 1903.

⁴ N. Y. Med. Jour., Feb. 14, 1903.

icterohematuric fever, which he claims sometimes results from quinin poisoning. The quinin was discontinued, the heart stimulated, and a supporting diet ordered, all of which resulted in the disappearance of the symptoms of quinin poisoning in 6 days. He proved that these symptoms were due to quinin by administering 20 days later a decoction of cinchona bark at 6 in the morning. In 3 hours the patient had a chill which was followed by moderate fever for 4 hours. While there were no tremors or vomiting, the patient complained of pains in the loins, there was slight jaundice, and the urine was dark colored. Lamonaca states that these effects of quinin occur only in patients suffering from malaria who have a special predisposition to poisoning by quinin. The symptoms are not due to the malaria, may occur after comparatively small doses of quinin, and appear 2 to 6 hours after the administration of the drug. In these cases quinin should not be given. Resource may be had to arsenic, iron, methylene-blue, and other substitutes in such cases.

L. A. Connor¹ reports a case of **poisoning by 6 grains of quinin** in a man of 27. Fifteen minutes after taking two 3-grain quinin pills he complained of burning of the skin and palpitation, to which were shortly added vertigo, faintness, and great weakness. Upon examination his face was pale, he was pulseless, and the respirations were shallow. The heart-beat was too rapid to count, but it was audible, and under stimulation improved so that when it was possible to make a count it was 180. There developed a diffuse scarlatiniform rash associated with swelling of the skin which extended over the trunk, extremities, and face. This eruption disappeared almost entirely on the following morning, and 2 days later, although the pulse was somewhat irregular, the patient was practically well. He did not complain of any ringing in the ears or deafness. A distinct idiosyncrasy to quinin existed in the family.

W. S. Magill² reports an unusual **case of criminal poisoning by aconite**. The defendant in this case purchased a 2-ounce bottle of tincture of aconite and mixed one-half of this amount with the contents of a pint bottle of port wine which he sent with criminal intentions to a person. On the following morning the victim drank half of the wine and was immediately seized with dizziness, inability to move, a creeping sensation in the muscles, and dimness of vision. His life was saved, however, at the expiration of 3 hours' strenuous treatment. Aconitin was discovered in the liquid by chemical analysis and its toxicity was tested by intravenous injections in increasing amounts, while at the same time observations were taken of its effect upon pulse, blood-pressure, and respiration. These results were compared with the standard solution of aconitin. The dose of the poison can be learned when the tabulated curves coincide. Magill claims that this method of chemical analysis is very accurate in determining very small quantities of powerful poisons, and is also of value in identifying alkaloids even when they are mixed.

R. E. Legat³ reports a **case of mushroom poisoning** in a man who 15 minutes after eating some mushrooms became pale and cyanosed and

¹ Med. Rec., 1903, p. 535.

² Med. News, May 31, 1902.

³ Brit. Med. Jour., Nov. 8, 1902.

bathed in a cold sweat. He complained of faintness, oppression in the chest, disturbance of sight, and intense itching of the skin of the hands and forearms. Ten years previously he had been similarly affected by eating mushrooms. There was a rash resembling erythema urticaria, which began in the hands, and spread to the arms, down the chest and abdomen to the legs and feet. It disappeared from the upper part of the body when it had reached the feet. It was most marked on the flexor surface and in the neighborhood of the large joints. The suddenness and severity of the onset of the symptoms were out of proportion to the amount of mushrooms eaten, as the patient had only taken 3 or 4 small ones. Other members of the family had partaken of the same dish without any untoward results.

C. L. Urriola¹ reported a case exhibiting unusual idiosyncrasy for iodoform in a nurse who, after washing iodoform gauze used in dressing a patient, experienced itching in the arms and forearms. The skin became red and edematous and in 4 hours the arms to the elbows appeared erysipelatous. A few hours later the face showed a pruriginous eruption on an erysipelatous skin. This condition also appeared on the back in spots. Fever developed on the fifth and sixth days, and was probably of malarial origin. The patient recovered in 2 weeks.

Variot and Du Castel² describe a case of poisoning by belladonna ointment which had been applied for the relief of articular rheumatism in a child of 7½. Three ounces of the ointment had been applied within 36 hours. This was followed by distinct symptoms of belladonna poisoning, which, however, disappeared soon after the proper treatment was instituted. While the ointment did not contain poisonous amounts of belladonna, the symptoms of poisoning were attributed to the fact that there was a slight excoriation of the skin caused by a previous application of salicylate ointment, and also to the fact that the mother had applied energetic friction over a large area of the skin for a considerable length of time.

G. R. Livingstone³ reports a case of belladonna poisoning following the application of a belladonna plaster. The patient was a man who suffered from pain in the back, for the relief of which, after using numerous counterirritants, the belladonna plaster was applied. In a few hours the patient complained of shortness of breath, a sense of oppression over the chest, and thirst. The temperature was elevated; the pulse was irregular and intermittent, afterward becoming rapid; the respirations were rapid; the pupils were dilated; he was apparently paralyzed in the right arm and leg; he was aroused with difficulty. After the removal of the plaster all the symptoms disappeared in a few hours.

John D. Gimlette⁴ discusses the botany, toxicology, and therapeutics of datura, found in the Federated Malay States. The species *Datura fastuosa* and *Datura alba* are the ones commonly found in this district. The leaves are broadly ovate, about 5 to 10 inches long and 4 inches broad at its widest point. The margin is toothed, petiole 4½

¹ Brit. Med. Jour., Oct. 25, 1902.

² Amer. Med., Oct. 4, 1902.

³ Brit. Med. Jour., June, 1903, p. 1141.

⁴ Brit. Med. Jour., May, 1903, p. 1141.

inches long, apex acute, base unequal, glabrous or sparsely tomentose, the upper surface dark grayish-green, and the lower surface paler. A fetid smell arises from the fresh leaves when crushed, which have a bitter taste. The flowers are axillary, on short peduncles about $\frac{1}{2}$ inch in length, single and erect. The calyx is tubular, five-angled, five-toothed. The corolla is funnel-shaped, purple or white outside, and white within. The lobes are oblong, ovate, cuspidate, length of funnel about 6 inches. The stamens are inserted near the base of the tube, included, anthers linear, with parallel cells, opening by slits. The ovary is two-celled, falsely four-celled by false septums, the ovules are attached to both the true and the false septa. The style is filiform, the stigma bilamellate. The fruit is an oblong globular capsule, the seeds indefinite. The embryo has the characteristic curvation. The fruit-stalk recurs with maturity until the ripe fruit becomes pendent. While *Datura alba* is the common datura of the Federated Malay States, *Datura fastuosa* is more common in certain districts. The datura seeds resemble those of the common chillies, and may be mistaken for them. The seeds are almost reniform in shape, about $\frac{1}{4}$ inch in length, somewhat less in width, and have a slightly bitter taste. There is no marked odor and the surface is somewhat shriveled except on the two compressed sides. The testa is tough and rough. The embryo embedded in a white oily albumin is curved in a manner peculiar to the genus. The 3 characteristic symptoms of poisoning by this drug are (1) paralysis of the salivary nerves, (2) paralysis of the third nerve, and (3) paralysis of the inhibitory fibers of the vagus of the heart. There may be symptoms of insensibility commencing early. The duration of the symptoms is usually about 2 days, and the drug is more serious in its effect when given to children and old persons. Excessive dilation of the pupils is looked upon as a dangerous symptom in datura poisoning. Before complete recovery occurs there is some impairment of memory. The dose of daturin, the active principle, is $1\frac{1}{2}\text{ to }2\frac{1}{2}$ grains. The active principle is a mixture of atropin and hyoscyamin. Sixteen grains of the datura stramonium seeds proved fatal to a child in 24 hours. The fatal dose is said to be 100 seeds, or what is equal to $\frac{1}{2}\text{ to }1\frac{1}{2}$ grains of the alkaloid daturin. Poisoning by datura is preferably treated by the administration of potassium permanganate. The stomach should be washed thoroughly with a solution of this drug, which should not be stronger than 1 grain to the ounce. Opium, pilocarpin, and chloroform inhalations have been used successfully in cases of stramonium poisoning. The administration of tannic acid, or of decoctions containing this acid, is recommended.

Courtois-Suffit and Trastour¹ describe a **case of fatal colchicin poisoning** in a man 43 years old, who took 12 capsules containing 0.25 mgr. of colchicin and 20 cgm. of methyl salicylate in one hour for the relief of gout. In a few hours he vomited blood-stained mucus, and there developed melena and hematuria, but there was no diarrhea, abdominal pain, or tenderness except in the epigastrium. Tremors were

¹ London, Lancet, May, 1903.

present. The urine—amounting to 2 liters in 24 hours—contained albumin and blood. In 10 days hiccoughs developed, the tongue became coated and dry, and the patient died. The necropsy revealed intense congestion of all the viscera and the presence of a marked interstitial nephritis. Colchicin was found in the urine up to the time of death. It must be noted that the usual symptoms of colchicin poisoning—namely, headache, abdominal pain, abundant vomiting, and diarrhea—were absent. This case shows the need of caution in administering colchicin for gout in cases of kidney disease.

O. Seifert¹ reports a case illustrating the **occasional bad after-effects of the administration of exalgin**. The patient, who had taken 0.5 gram of this drug for headache and insomnia, complained a few hours afterward of palpitation of the heart and a feeling of oppression. After subsequent doses these symptoms were more marked and were accompanied by formication, spots before the eyes, vertigo, tinnitus, dilation of the pupils, increased pulse-rate, and pronounced cyanosis of all the visible mucous membranes. All the symptoms disappeared in 2 days after active treatment with warm baths and diuretics.

S. Amberg² injected intraperitoneally, subcutaneously, or into the spinal cord, **epinephrin** in large doses **into animals**. The injections were followed by vomiting, excitement, and general weakness, or complete prostration with bloody diarrhea and death. Death ensues from cardiac or respiratory paralysis, or from both. The lethal dose is between 1 and 2 mgr. per kilogram intravenously. The subcutaneous lethal dose is between 5 and 6 mgr.; the intraperitoneal dose is between 0.5 and 0.8 mgr. Caution should be used in employing suprarenal extract therapeutically in men.

B. K. Rachford and W. H. Crane³ made a study of the **comparative toxicology of ammonium compounds**. They made experiments upon ordinary house-mice, and sought to establish the actual and relative toxicity of various salts, of which ammonium, sodium, potassium, and calcium formed the bases. Those salts that did not produce toxic symptoms in 10 minim doses of a 5% solution were considered nontoxic, or so feebly toxic that they did not play any role in producing systemic symptoms in autointoxications. They cite a number of facts and give tables which seem to show that ammonium is an important factor in the causation of systemic symptoms in certain acid intoxications. The importance of the **ammonium ion** in these intoxications depends upon the toxicity of the acid ions with which they are combined. When the ammonium compounds are given by the mouth they are not toxic, which is explained by the fact that they do not reach the general circulation, but are converted into urea by the liver. A study of the table given shows that the ammonium ion when combined with an organic acid loses its toxicity to a great extent. All these organic acids may be excreted in considerable quantities, therefore, without bringing about any toxic symptoms, and thus absence of symptoms of ammonium

¹ Wien. klin. Rundschau, June 29, 1902.

² Arch. Internat. de Pharmacodyn., vol. xi.

³ Med. News, Oct. 25, 1902.

poisoning in diabetes and other organic acid intoxications may be explained. The **sodium compounds** are comparatively nontoxic, and it is fair to conclude that these salts are not directly responsible for any of the systemic symptoms of acid intoxications. If, however, the acid intoxication is so great as to draw largely upon the sodium in the blood, and is sufficient to diminish the alkalinity of the blood, serious symptoms may ensue. The **potassium ion** has about one-half the toxicity of the ammonium ion when combined with the same inorganic acids. When **magnesium** is combined with acid ions it becomes very toxic. Magnesium may occur in excess in the urine in diabetes mellitus when the available ammonia in the system has been exhausted, at which times the magnesium in the body is drawn upon for the purpose of neutralizing the acids. It is of little therapeutic value, as when given by the mouth the quantities absorbed are so small that it cannot replace to any extent the ammonium which is excreted in combination with acids in acid intoxications. **Calcium** possesses very little toxicity when combined with acid ions. In fact, it is the least toxic of the 5 bases. It is not likely that this base plays any part in the production of acid intoxication symptoms. **Sulfuric, nitric, phosphoric, and hydrochloric acids** are apparently nontoxic, but their ammonium salts, *i. e.*, the sulfate, nitrate, phosphate, and chlorid, are distinctly toxic, due to the ammonium which they contain. **Organic acids** are present in considerable quantities in the body under certain pathologic conditions, and are neutralized and eliminated in combination with ammonium. However, severe acid intoxications in which large quantities of ammonium in combination with certain organic acids pass through the body on their way to excretion may not give the characteristic symptoms of ammonium intoxication. Diabetes mellitus is an example of this kind. **Lactic acid** is nontoxic, and plays no role in the production of intoxication symptoms. It has the power of partly destroying the toxic action of ammonium when combined with it to form a salt. A reference to one of the tables shows that large quantities of acetic and sarcolactic acid in combination with ammonium may be excreted without producing ammonium intoxication symptoms, from which it would seem that ammonium is often better adapted for the neutralization of certain organic acids than for certain inorganic acids. When oxalic acid is combined with ammonium, the resulting salt is very poisonous, and this is probably due to the oxalic acid. **Oxalic acid** may be a potent factor in the production of systemic intoxication when present in excess in the body and mediums. The relationship between oxalic acid and these symptoms is not clearly known, although it is well established that oxalic acid may be present in the urine without being associated with systemic intoxication. **Carbonic acid** unites with ammonium of the tissues and is converted into urea, so that a failure of the urea-forming functions of the liver may cause the presence of a large quantity of ammonium carbonate in the general circulation. It is therefore claimed that ammonium carbonate, which possesses a considerable degree of toxicity, may contribute to systemic intoxications which are the result of functional inactivity of the liver.

Ichthyol in an aqueous solution, in the proportion of 1 to 3, is claimed to be a very satisfactory remedy for ivy poisoning.¹ It is preferably applied with a brush. The poisoned part should be washed thoroughly with soap and water before the ichthyol is applied. It reduces the heat and redness, relieves the itching, and prevents the spread of the inflammation.

A. R. Ellis² reports a fatal case of poisoning by potassium chlorate in a woman who took by mistake an ounce of this drug. In 2 hours she began vomiting and purging, and renal symptoms developed on the third day, when the urine, which was almost suppressed, became almost black. Treatment consisted in the application of digitalis to the back and the administration of simple diuretics, but the patient died in 8 days.

A. Gerlach³ reports a case of formalin poisoning. The patient when found was comatose, breathing stertorously, and upon washing the stomach the odor of formalin was distinctly observed. There was almost complete suppression of urine, and later there followed diarrhea. Consciousness began to return on the following day. As the patient improved she complained of vertigo and burning in the throat, and the urine contained traces of albumin and formic acid. The patient finally recovered completely.

J. D. Batson⁴ describes a case of strychnin poisoning in which pilocarpin hydrochlorate was successfully used as an antidote. The patient, a boy of 2½, had taken an unknown quantity of strychnin. Batson arrived an hour later, and administered tannic acid in solution, and gave apomorphin hypodermatically. The stomach was thoroughly washed out with tannic acid solution and chloral hydrate was administered. In spite, however, of the administration of the latter drug, the convulsions increased in force and frequency, occurring every 2 minutes. In 2 hours' time the convulsions were tonic and death was imminent. Pilocarpin hydrochlorate was given hypodermatically in $\frac{1}{20}$ grain doses. Two doses were given at 20 minutes' interval, and in 3 hours the convulsions had ceased entirely and the patient made an uneventful recovery.

William Salant,⁵ Fellow of the Rockefeller Institute, New York, experimented upon rabbits with a view of determining the explanation of the result of a study made by Meltzer and Salant, who found that **nephrectomized rabbits were able to receive more than fatal doses of strychnin** when gradually injected, with scarcely any cumulative results. To determine the influence of the contents of the large intestine upon strychnin, nephrectomized rabbits were given gradually increasing doses of strychnin (from 2 to 8 mgr.) and then the entire contents of the gastrointestinal tract were examined carefully for strychnin with negative results. When 1 mgr. of strychnin was added to blood, crushed brains, etc., in testing the efficiency of the method, strychnin was readily

¹ Clin. Rev., Oct., 1902.

² Med. Rec., May 16, 1903.

³ Münch. med. Woch., Sept. 9, 1902.

⁴ Phila. Med. Jour., April 18, 1903.

⁵ Amer. Med., Aug. 23, 1902.

detected. In a second series of experiments 1 mgr. of strychnin was added to the gastrointestinal contents of one animal, 2 mgr. were added to the entire gastrointestinal contents of a second animal, and 1 mgr. was added to half of the contents of the third rabbit, but although carefully searched for, no strychnin could be found. These results seem to have important medicolegal bearing, as medicolegal experts have claimed to have discovered strychnin in the gastrointestinal tract. The question arises, Are the results different with the contents of the gastrointestinal tract of human beings? In order to throw some light on this subject, Salant added 1 mgr. of strychnin to the contents of the stomach alone and was able to detect the strychnin readily. Again 1 mgr. was added to the contents of the small intestine with positive results; still again the same was added to the contents of the cecum and colon, but with negative results, proving that it is the contents of the colon and cecum alone in which it is impossible to discover the presence of strychnin. In order to determine whether there is anything present in the colon and cecum which prevents the detection of the strychnin when mixed with the contents of the entire gastrointestinal tract, he added 1 mgr. to two-thirds of the contents of the stomach with which one-third of the large intestine was mixed, and was unable to discover strychnin. When 1 mgr. was added to the contents of the small intestine with which some of the contents of the large intestine had been mixed, he was unable to discover any strychnin. Thus it is proved that some of the contents of the large intestine contained something which interfered with the detection of strychnin in small doses by the present known methods. He is now experimenting with a view to determining to what extent the large intestine interferes with the physiologic effects of strychnin. [Since the above was written Salant¹ has repeated his experiments and found that the method he employed in his former investigation for the extraction of strychnin was faulty, and that by a modified method he was able to extract strychnin from the contents of the colon and cecum.]

Frederick C. Forster² reports a case of **acute alcoholic poisoning** in a child of 4 who took 2 ounces of undiluted whisky at one dose. Insensibility came on soon after the ingestion of the drug, and when seen by the physician he was cold and clammy, the breathing shallow and sighing, and his pulse was irregular and uncountable. The corneal reflex was absent; the pupils dilated and reacted only slightly to light. The interesting feature of the treatment consisted in the administration of saline injections per rectum, which seemed to have a marked influence upon the child's recovery.

R. Hunt³ reports the results of his studies of the **toxicity of methyl alcohol** on man and the lower animals. He claims that poisoning by wood alcohol has become more frequent in the last few years. This is due to the fact that wood alcohol is used in place of ethyl alcohol in the manufacture of varnish, bay rum, jamaica ginger, and peppermint. The symptoms of acute intoxication are similar to those produced by

¹ Amer. Med., June 27, 1903.

² Brit. Med. Jour., May 26, 1903.

³ Lancet, Oct. 18, 1902.

ethyl alcohol, except that they are more prolonged, lasting from 2 to 4 days, while those of ethyl alcohol, as a rule, do not last longer than 6 hours. Experiments showed that this is not due to impurities. When lethal doses of methyl alcohol and ethyl alcohol were given to dogs, death followed more rapidly after the administration of the latter. Methyl alcohol was retained longer in the nerve tissues than ethyl alcohol, and in consequence of this fact small doses repeatedly given had a very poisonous effect. Degenerative changes in the optic nerve and blindness in the fatal cases were observed in the lower animals. These may also occur in man as a result of small and nonfatal doses. His experiments demonstrated that methyl alcohol is a dangerous substitute for ethyl alcohol in any preparation that is to be taken internally.

S. W. Abbott¹ urges that **when wood alcohol is sold, in no matter what form, it should be distinctly marked poison**, and that only registered pharmacists should be permitted to sell it, and then only when a record of the sale should be made.

An editorial in the "Philadelphia Medical Journal"² discusses the **fatal effects of the administration of wood alcohol**. The most prominent effect is the influence upon the optic nerves. As the result of taking this drug, blindness or an optic neuritis may follow. The effect comes on rapidly and may last a long time. The editorial aims to emphasize the fact that the cheapness of wood alcohol offers a temptation to manufacturers to substitute it for ethyl alcohol, and that its use should be restricted by stringent laws. It refers to the patients of Sherer who took this drug for purposes of intoxication.

John Reid³ observed in 2 cases of **arsenical neuritis** that the **hemoglobin was collected in beads along the edge of the red blood-corpuscle**. This was not found in single specimens, but in numerous instances. The condition must not be confused with the crenation of the corpuscles. The beads were very dark in both cases. In every other respect the blood was absolutely normal and the general health of the patient good.

Blumenthal⁴ claims that **anilin metarsenite**, known as atoxyl, is only one-fortieth as poisonous as Fowler's solution, but in sufficient quantities it may produce the characteristic lesions of poisoning by arsenic. The anilin does not seem to play any part in the poisoning.

Busscher⁵ claims that **ferric hydroxid is useless in the treatment of arsenical poisoning**, and even sometimes is harmful. Experiments on rabbits and dogs demonstrated that the hydroxid when given with or within 5 minutes of a dose of Fowler's solution had no effect on the action of the poison, though when the dose of arsenic was relatively small it seemed to prolong life. When the arsenic was given in large doses, the oxid had the same effect but it was less marked. Ferric hydroxid increased the action of the poison when it was given in the form of arsenious anhydrid; and even when nontoxic doses were given,

¹ N. Y. Med. Jour., Feb. 14, 1903.

² May 23, 1903.

³ Lancet, Nov. 15, 1902.

⁴ Amer. Med., July 26, 1902.

⁵ Arch. Internat. de Pharm. et de Therap., No. x, 5-6.

death followed when the ferric hydroxid was given at the same time. Busscher in explaining this fact states that iron arsenite is formed in the presence of ferric hydroxid. This salt, although less poisonous than potassium arsenite, is more poisonous than arsenious anhydrid. Experiments with the sulfates did not give satisfactory results. Poisoning by arsenic should be treated by lavage of the stomach, the administration of emetics and a purgative, but not by antidotes.

The "Boston Medical and Surgical Journal"¹ reviews the work done by Gabriel Bertrand, who published a paper in the "Annales de l'Institut Pasteur,"² on the subject of **arsenic in the organism**. He endeavored to determine the amount of arsenic which is found in living organisms under normal conditions, and whether arsenic is a primordial element of the living cells, just as carbon, nitrogen, and other elements are. He used for this purpose the cetaceans, sea-birds, fish, and animals that inhabit the deep sea, with the following results:

NAME OF SPECIES EXAMINED.	ORGANS OR PARTS EXAMINED.	WEIGHT OF DRY MATTER EXAM'D IN GMS.	WEIGHT OF REAGENTS EMPLOYED.		ARSENIC FOUND IN MGR.
			Nitric Acid.	Sulfuric Acid.	
Tunny	Skin.	32.7	36	14	0.005
"	Muscle.	30.1	71	14	0.0015
Sea-bass	Skin.	22.2	45	12	0.001
"	Muscle.	17.1	33	8	0.001
"	Scales.	Ab't 20	33	8	0.001
Sea-tortoise	Scales.	20	40.5	9.5	0.0035
Petrel	Feathers.	34	43	15	0.0025
Grampus	Horn.	50	45	10	0.0025
"	Epidermis.	40	86.5	19.5	0.0035
"	Skin.	14.4	36	9	0.002
Sheep	Thyroid gland.	20	50.5	10.5	0.004
Sponge	Entire.	36.7	67.5	17.5	0.005
Actinia	Entire.	13.1	18	7	0.002
Starfish	Entire.	29.0	40.5	19.5	0.002
Sea-urchin	Entire.	30.4	32.5	33.5	0.0045
Holothuria	Entire.	81.8	72	15	0.003
Barnacles	All except the shells.	31.5	147	26	0.002
Cuttle-fish	All except the bones.	40.8	81	14	0.002
"	Testicles.	12.5	16	7	0.0015
Tunny	Skin.	26	180	40	0.0035 to 0.004
"	Skin.	24.7	45	15	0.0025 to 0.003

He also examined sand dredged from the bottom of the sea at different depths, and in one instance found a perceptible trace of arsenic, and in another found in 38 grams of sand collected at two-thirds of a mile about 0.004 mgr. to 0.005 mgr. of arsenic. He believes that arsenic is a fundamental element of living organisms, and that in medicolegal investigations one should not be content with determining the mere presence of

¹ April 30, 1903.

36 M

² January, 1903.

arsenic, but should make quantitative analyses when this element is present.

Thomas Stevenson¹ reports the **postmortem records of 3 cases of poisoning by tartar emetic.** He states that poisoning by this drug is now rare. In the first case, a girl of 19, whose body was found 8 days after death, the evidence of acute gastritis and subacute enteritis which suggested poisoning by an irritant poison, not arsenic, was present. In an analysis of the organs Stevenson found in the stomach, bowels, liver, kidneys, and brain 20.12 grains of tartrated antimony. In the second case, a woman of 36, the body was examined 21 months after burial. The signs of acute nonulcerative gastroenteritis were observed and 29.12 grains of tartar emetic were removed from the stomach, intestines and their contents. The third case was that of a woman of 41 who was examined 5 years after burial. The body was found in an excellent state of preservation. The examination showed the presence of acute gastroenteritis and an effusion of blood into the stomach. It could not be decided whether this was antemortem or postmortem. Chemical examination of the intestines, liver, and kidneys resulted in the recovery of 3 83 grains of tartrated antimony. He gives the clinical notes of two of these cases, and states that there was nothing in the clinical history to suggest poisoning. The symptoms are very similar to those which are seen every day in the summer months when gastrointestinal disturbances are frequent. There had also been nothing in the history to suggest the contamination of food, to indicate suicidal intentions, or to suggest suspicion against the husband in the one case, or any suspicious symptoms whatever in the others.

ACUTE OPIUM POISONING.

Finkelstein² concludes, after a review of the question of the **treatment of acute opium poisoning,** that none of the drugs now employed is a specific. He claims that the only specific antidote is potassium permanganate, and that it acts as an oxidizer and possesses a selective affinity for the drug. It should be given in doses of 1 gram of a 4 % to 5 % solution every 30 to 60 minutes until improvement is noted. It will take 4 grains of potassium permanganate to neutralize 3 grains of morphin, and 6 grains of potassium permanganate for each fluidounce of a liquid preparation of opium when taken internally. When the quantity of poison ingested is not known, it is advisable to administer 8 to 10 grains of the antidote in a glass of water, after which the stomach should be washed out with weaker solutions of the permanganate.

L. Hirschlaaff³ injected dogs with morphin solution for periods varying from 3 weeks to 5 months, in the **effort to produce a protective serum which would counteract the effect of poisoning by morphin and other alkaloids.** The serum from animals treated in this way was found to be effective against fatal doses of morphin when administered

¹ Brit. Med. Jour., April, 1903, p. 873.

² Internat. Med. Mag., May, 1903.

³ Med. News, Jan. 31, 1903.

to puppies and mice. The author has used this serum clinically in one case only, with encouraging results; but as the amount of opium taken was not definitely known, nor was the treatment confined to the injection of the antitoxic serum, the results cannot be said to be conclusive.

E. F. Willoughby¹ recommends the **infusion of salt solution in morphin poisoning**. He reports a case in which the patient had taken 8 grains of the drug, and for whom the usual well-known treatment for poisoning by morphin was unsuccessful. Immediately after the saline infusion was given the patient began to improve, and thereafter rapidly recovered.

Alfred Gordon² reports a case of **acute morphin poisoning which presented unusual spinal symptoms**. The patient had taken 1½ grains of morphin sulfate, and half an hour later suddenly became pale, semi-comatose, and weak, and in a short time there were tonic contractions of the arms, and trismus. After vomiting following the administration of an emetic, the patient was found to be pale, covered with perspiration, and unable to walk. After being forced, however, to take a few steps he presented the symptoms of distinct spastic paralysis. The knee-jerks were greatly increased and ankle-clonus and Babinski's sign were present. In 17 hours all the symptoms of irritation of the motor tract had disappeared. No similar case has been reported, to the knowledge of the author. He emphasizes the fact that Babinski's sign may be present in a functional disturbance of the spinal cord, and does not necessarily mean that there is degeneration of the motor tracts.

J. D. Merrill³ records a case of **poisoning by morphin in an infant 1 month old**, who was given by mistake $\frac{1}{6}$ of a grain of the drug. The mother was aroused 7 hours later by the child, who was found in convulsions. Strychnin hypodermatically and hot coffee by the rectum were ordered, and artificial respiration was practised. An hour and a half later the child was unconscious and deeply cyanosed. The pupils were contracted; the skin moist; the respirations shallow and 4 to the minute, the pulse weak, and the reflexes absent. At short intervals there occurred general tetanic convulsions of from 30 to 50 seconds' duration, at which time the pulse became imperceptible. The patient recovered.

OPIUM HABIT.

J. Hofmann⁴ advises the **use of camphor in the treatment of the morphin habit**. In healthy individuals camphor increases the blood-pressure and the contraction of the heart-muscle. The morphin diminishes the blood-pressure and dilates the heart-muscle, although the morphin habitué is stimulated rather than depressed by the drug. Dilatation of the heart occurs when morphin is removed, and it is during this time that camphor is indicated. Camphor is substituted for the morphin, which is given in gradually reduced doses, and the author claims that in this way the "abstinence" symptoms can be almost completely averted.

¹ Lancet, May 10, 1902.

² Med. Rec., May 2, 1903.

³ Phila. Med. Jour., March 22, 1903.

⁴ Therap. Monats., July, 1902.

Moody¹ contends that **it is possible to cure the morphin habit by home treatment.** The patient must be honest in his desire to be cured, and must be assisted by a nurse or friend who is intelligent and sensible enough to carry out the physician's orders. The physician must have the absolute confidence of the patient, and must thoroughly understand the pathologic condition. First of all, the system must be thoroughly cleansed, after which should follow a treatment which includes the use of nerve sedatives and the employment of suggestion. The preliminary examination should be exhaustive and impressive. The patient should be told that a substitute will be given for the morphin for a few days, and impressed with the fact that he will have no desire for the drug after that time. The substitute should consist of sodium bromid and dionin. The latter should be given in doses representing half that of the daily dose of morphin. For example: should the patient be taking 12 grains of morphin in the day, the following prescription would be indicated: Sodum bromid, 3iv; dionin, gr. lxxij; distilled water, f5vj. Tablespoonful as directed. This should be administered every 2 hours until the patient becomes sleepy, and then every 4 hours. As each dose is taken from the bottle an equal quantity of water is added in the presence of the patient, who at the same time is told that when the liquid becomes weak he will need it no longer. He must be firmly told that he will get well, and will remain well. Hyoscin hydrobromate relieves the discomfort and restlessness better than any other drug and places the mind of the patient in a position to receive suggestion. Spartein sulfate may be given with the hyoscin in case the heart is weak.

J. B. Mattison,² in a letter addressed to the editor of the "New York Medical Journal," **criticizes severely the hyoscin treatment of the morphin habit.** He claims that there is no place in the sound therapeutics of the morphin disease for routine treatment with this drug. He considers it inhuman and dangerous and warns the profession against it.

Margaret S. Halleck³ tried the experiment of **withdrawing the morphin immediately in treating cases of morphinism.** In 2 cases the patients had been smokers from 3 to 10 years. In another case the drug had been taken by the mouth for 10 years, and in 2 other cases morphin had been taken by the mouth and hypodermatically for 7 years. Strychnin, hyoscin, and codein were given in all the cases. The morphin was discontinued immediately and all the after-symptoms were in all cases of short duration.

George E. Petty⁴ reports a number of cases of the **heroin habit.** He states that the primary stimulating effect of morphin is absent when heroin is taken, and that it is a more prompt and certain hypnotic, while it is less powerful as a reliever of pain. It does not interfere with digestion or with the secretion and excretion as much as morphin does. Its action upon peristalsis is not so quick or so intense. Neither does it produce constipation to the same extent. He also claims that its prolonged use sometimes results in the formation of the opium habit.

¹ Amer. Med., Feb. 21, 1903.

³ Med. Rec., April, 1903.

² N. Y. Med. Jour., Feb. 21, 1903.

⁴ Med. Rec., April 18, 1903.

Carlos de Vicente¹ reports a case of **heroin poisoning** in a man 42 years old who took by mistake at one time 100 grams of a solution which contained about 0.60 gram of heroin hydrochlorid. The patient was suffering from an attack of indigestion, and it was to this fact that the author ascribes the slow absorption and consequent escape from death, as he did not see the patient until 2 hours after the accident. The patient was conscious and appeared to be perfectly clear mentally. He complained of cranial oppression, noises in the head, sickness, vertigo, lassitude, and a feeling of intense cold in the hands and feet. From time to time a feeling of sleepiness came over him. The face was anxious; the pupils slightly contracted, but reacted readily to light; the tongue was moist; pulse hard and regular, 80 a minute; the respirations regular and normal in rhythm. The skin was cold and dry. There was some slight vomiting, after which the respirations fell to 14 and 16 a minute and became shallow. Energetic stimulation was followed in 4 hours by great improvement in the symptoms, and on the next day the patient had practically recovered. De Vicente claims that this case serves to confirm the experiment of Lepine, who estimated that heroin was 10 times less toxic than morphin; that it was not possessed of any convulsive properties; did not influence the blood-pressure or the cardiac ganglions, but possessed an effect upon the respiration equal if not superior to that of morphin.

MacAlister² describes a case of **poisoning by an antiseptic** in a man who with suicidal intentions swallowed a glass of a liquid which he believed to be carbolic acid. The nature of the liquid was not absolutely known, but it was an antiseptic having the odor of creolin. The patient was seized with violent pains in the abdomen. He became cyanosed and somnolent. The respirations remained normal; the action of the heart regular, though rapid. The next day the patient was jaundiced; there was an odor of creolin on his breath, and his mental condition had improved. There was no derangement of the kidney functions. By degrees the patient entirely recovered. MacAlister claims that the interest in this observation rests in the tolerance of the human organism for a noncorrosive antiseptic. He believes that the blood of this patient had at one time been entirely saturated with the antiseptic. He suggests that in certain infectious conditions antiseptics may be administered in large doses.

J. A. Raubenheimer³ described a case of **carbolic acid poisoning in a child of 8**, the result of the application of towels saturated with 1:40 carbolic acid solution to the legs from the ankles to the groin. The symptoms developed an hour after the application of the bowels, when the child became quiet and drowsy. An hour later she could not be aroused to consciousness. The pupils were dilated, the pulse feeble and rapid, and the respirations quiet. She soon became cyanosed and almost pulseless. After the towels were removed and stimulation administered,

¹ Rev. de Med. y Cir. Pract., May 14, 1903.

² Gaz. Hebdo. de Med. et de Chir., Dec. 14, 1902.

³ Brit. Med. Jour., May 16, 1903.

in a few hours the patient began to improve, and finally recovered. It was not until 6 hours after the application of the towels that the urine showed the usual tests for carboluria, which condition persisted for 24 hours afterward.

G. G. Marshall¹ reports an interesting case of **carbolic acid poisoning** in a man of 74. The nurse, by mistake, injected into the bowels through a rectal tube 1 ounce of carbolic acid and 4 ounces of sweet oil. She thought that the carbolic acid was glycerin. The mistake was immediately discovered, and the bowels were irrigated with 2 quarts of water at once. In 5 to 8 minutes the strength of the patient rapidly failed and he became helpless. The pulse was weak and irregular and in about 2 hours imperceptible. In 15 minutes the patient could not answer questions, and was indifferent to his surroundings. The eyes remained open and the pupils were contracted. The lower jaw was dropped and the tongue protruded slightly and waved from side to side. The respirations were regular and heavy. Four ounces of alcohol mixed with water were injected 10 minutes after the bowels were washed out. The bowels were then again freely irrigated with water and later with milk. Strychnin and digitalis were given hypodermatically, associated with brandy and nitroglycerin. The patient soon began to respond, and 8 days after the accident, beyond the fact that he was very weak, there seemed to be no after-effects of the poisoning. The urine became smoky in appearance by noon of the next day after the accident, and continued so for about 36 hours.

John R. Atwell² reports a case of **carbolic acid poisoning** in a woman of 35 who drank half a fluidounce of phenol probably diluted with water. The treatment consisted in hypodermatic injections of atropin sulfate and nitroglycerin, irrigation of the stomach, and the administration through a stomach-tube of epsom salts, dilute alcohol, and strong coffee at different times. Rectal enemas of salt solution and hypodermoclysis of saline solution under the breast and side of the chest were also given. Under this treatment the woman made a speedy recovery.

K. Liepelt³ reports 4 cases of **poisoning by lysol**, and reviews the literature. In the **first case** a girl of 16 took 5 swallows of lysol with suicidal intent during an attack of melancholia. This was followed by pain in the cervical region, an odor of lysol on the breath, and difficulty in swallowing. After washing the stomach and the daily administration of 15 grains of sodium sulfate the patient recovered in 19 days. The **second case** was that of a girl of 15, who was found unconscious, with lips and tongue covered with a white membrane and a sweet odor to the breath. After washing the stomach, and the administration of Carlsbad salts, the patient recovered completely at the end of a month. The **third case** was that of a woman of 20 who was found in an unconscious condition. She had two hours previously taken 50 grams of pure lysol. When found, numerous tracheal rales could be heard and there were trismus, clonic and tonic contractions of the extremities, cyanosis of the face, and

¹ Med. Rec., Jan. 21, 1903.

² Virginia Med. Semi-Monthly, May 8, 1903.

³ Berl. klin. Woch., 1903, No. 25, p. 567.

absence of the corneal and pupillary reflexes. The stomach was washed out with 25 liters of water and 10 grams of strong oil of camphor were injected subcutaneously. In 4 hours consciousness returned. On the sixth day after the accident the urine was green and contained a small amount of albumin. The patient recovered in 2 weeks' time. The **fourth case** was that of a woman of 22 who took 30 cc. of lysol with suicidal intent. Soon after it was taken the stomach was washed out. The lips were red and greatly swollen, the mucous membranes of the lips and tongue came off in layers, and consciousness was lost. The pulse was small and the temperature was 37.6° C. Twenty-two hours later the urine was dark in color and contained traces of albumin but no sugar. In 8 days the patient had recovered. The author collected from the literature 41 cases of poisoning by lysol, all of which occurred from the external use of the drug, with 4 deaths. There were 30 cases following the internal use of the drug, of which 13 were fatal. In only 3 of the cases was the stomach washed out. In the 17 cases which recovered washing of the stomach was practised in 15. Liepelt advises that the stomach be washed out in these cases of poisoning until the water comes back entirely clear. The heart must be stimulated by heroic methods.

Walter S Cornell¹ reports a case illustrating the **value of artificial respiration in carbolic acid poisoning**. The patient had taken between 2 fluidrams and 2 fluidounces of "pure carbolic acid," the exact amount being uncertain. In 10 minutes the patient was unconscious and slightly cyanosed, the respirations were 40 and stertorous in character, and the pulse was rapid. The stomach was washed out by means of the stomach-tube and epsom salts and sodium bicarbonate given. Hypodermatically strychnin and atropin were administered. Artificial respiration was continued for an hour and a quarter, at the end of which time the patient was breathing feebly but regularly, when it was discontinued. The urine was not analyzed.

Sublamin and ethylenediamin compound of mercury were studied by A. Schuftan² with the view of determining their comparative toxicity with mercuric chlorid. He introduced the drug into rabbits by the mouth, subcutaneously, and intravenously, with the result that death occurred usually in the characteristic way. The first thing to be noted is marked excitement, shortly after which the head becomes more and more heavy until it can no longer be raised. The extremities then become paralyzed, and the animal falls over. Shortly before death the respirations become embarrassed and there are tonic convulsions. The muscles of mastication may be first involved and a bloody diarrhea may be present. By weight the sublamin was found less toxic than mercuric chlorid, but when it is remembered that 17 parts of the former correspond to 10 parts of the latter, the former appears more active, because a coagulation of albumin in solution does not take place. The author also experimented with a view to determining whether the increased toxicity was due to the ethylenediamin compound, but with negative results.

¹ Amer. Med., March 14, 1903.

² Med. News, Jan. 3, 1903.

Alfonso Boumans¹ describes a case of acute poisoning with mercuric chlorid in a woman of 23, who had taken 3 tablets which contained 1 gram each of the drug, with suicidal intent. As she claimed she had eaten nothing for 12 hours, the poison was probably taken on an empty stomach. In three-quarters of an hour after the ingestion of the drug there developed symptoms of acute poisoning. The stomach was washed and white of egg given in large quantities, after which the symptoms abated. On the next day the urine was retained and there was also partial suppression. The urine contained albumin, blood, granular casts, and renal epithelium. For the next 5 days the urine was suppressed; the stomach would not retain food and there was frequent vomiting of bloody fluid. The lips, gums, and under surface of the tongue were ulcerated and bled easily. Diarrhea and bloody stools developed on the fourth day. On the fifth day the urine began to pass in small quantities, and from this time on, the symptoms gradually disappeared.

Horatio C. Wood, Jr.,² records a case of mercuric chlorid poisoning resulting from a vaginal douche. The patient was a woman of 30 who had employed a douche of mercuric chlorid solution of a strength of 1 : 2000 for the relief of leukorrhea. The douche was painful even after reducing to a 1 : 4000 solution. After the third douche she complained of severe pains in the loins, frequent and painful micturition, anorexia, but no nausea or vomiting. The urine was smoky red in color, of acid reaction, and contained albumin, red corpuscles, and hyaline tube-casts. At the end of 2 weeks she had entirely recovered. This case is reported as a warning against the indiscriminate use of mercuric chlorid as an internal antiseptic, and the author criticizes severely the practice of giving this drug to patients for home employment.

Eli H. Long³ discusses poisoning by corrosives, in which he attempts to show that the nature of the destructive action depends upon their chemical affinities. In other words, they have such a strong affinity for one or more constituents of the tissues that the organic structure is destroyed in order to satisfy it. He also emphasizes the importance of selecting antidotes upon this basis. The poison should be diluted by copious drafts of water, and then neutralized as quickly as possible by the appropriate chemical antidote, of which the chief are dilute alkalies, dilute acids, and albuminous substances. Alcohol, tannic acid, and salts may be of occasional value. Emesis should be induced and emulsions given, such as oils, mucilages, and albuminous substances. Morphin hypodermatically is indicated to relieve the pain and lessen peristalsis, and stimulants should be given judiciously, while perfect rest in bed is enjoined.

The Dominion Statistician⁴ stated that in 1901 in Canada there were 8419 charges for indictable offenses, against 8291 in 1900. There were 5638 convictions in 1901—130 less than in 1900. The effect of the abuse of alcohol, he claims, is demonstrated by the following statistics. In 1899, 33.5 % of the convicted criminals were moderate drinkers; in 1900,

¹ N. Y. Med. Jour., April 4, 1903.

² Amer. Med., Dec. 27, 1902, p. 1006.

³ Med. News, June 27, 1903.

⁴ Canad. Jour. of Med. and Surg., Sept., 1902.

29.1 %; in 1901, nearly 30 %. About one-third of the criminals were addicted to drinking. The most serious fact of the criminal records in Canada is that there has been a disproportionate increase in the number of juvenile male criminals.

John Punton¹ discusses the **criminal responsibility of the epileptic**, and claims that an impartial medical committee should be appointed by the court for deciding this question. He criticizes the legal test for insanity, and claims that mental responsibility "is not compatible with a knowledge of right from wrong." He believes that epileptics are to a certain extent responsible for criminal acts, especially when the disease is brought about by their own default. He believes that the adjudication of the criminal acts of epileptics appeals to medicine rather than to law, and that in cases of murder in which epilepsy is proved the law should permit life imprisonment in an insane asylum rather than in a penitentiary. In another paper² Punton states that he believes that the question of mental responsibility of the epileptic should be a matter for an impartial medical commission to decide. This commission should be appointed by the court, who should receive a report of the examination before the trial. This examination should be made entirely independently of the lawyers engaged in the trial, and should be suitably compensated for by statutory law. He concludes that epilepsy is a symptom of some brain disease which tends to cause mental deterioration, and the mental responsibility depends upon the degree of damage that the brain has received from the disease. He does not believe that the legal test for insanity is sufficient, and is of the opinion that one may be mentally irresponsible and yet have a knowledge of right and wrong. When the epilepsy is due to the fault of the individual, then he is to a certain extent responsible for his criminal acts. The criminal acts of an epileptic are more properly dealt with by a physician than by the courts. He claims that in all cases of murder in which epilepsy is proved, the individual should be sent to an insane hospital rather than to a penitentiary. The mental responsibility of such an individual should be passed upon by a medical commission appointed by the court which should be referred to the County Medical Society to name its members.

The **criminal statistics in England and Wales**³ in 1901 showed a significant increase in crime in 1901 compared with 1900; although it is stated that this is not of serious magnitude. The total number of coroner's inquests in 1901 was 37,184, a slight increase over the statistics of the previous 2 years, and was accounted for by the large number of murders and suicides. There were 208 cases in which the verdict was that of murder. In 37 of these cases the murderer took his own life at the time of the crime. A slight increase in the number of criminal lunatics in detention is found.

There were 11,393 **suicides** in the German Empire⁴ in 1900, of which 8987 were by males and 2606 were by females. The proportion of males to females among 108,494 suicides in the German Empire during the

¹ Virginia Med. Semi-Monthly, Nov. 7, 1902.

² Lancet, March 7, 1903, p. 669.

³ Med. Rec., Nov. 15, 1902.

⁴ Med. Rec., Oct. 4, 1902.

last 10 years was 100 to 26.3. The statistics show a proportion of 20.3 suicides to 100,000 inhabitants for 1900.

Louis Adelman,¹ in discussing the **criminal aspect of the negro and his influence on the white race**, states that 60 % of the arrests in the southern States are of negroes. In 1901 in Washington, D. C., of 26,062 arrests, 13,780 were from the colored population, which numbered 88,325. In Montgomery, Ala., of 2687 arrests, 1793 were from a colored population of 12,000. In Birmingham, Ala., of 10,479 arrests, 6600 were colored. In Louisville, of 7958 arrests, 4313 were negroes, in a population of 57,000. In Nashville, where the colored population is 37,000, of 9837 arrests, 6081 were negroes. In Atlanta, in a colored population of 38,000, of 17,286 arrests, 11,502 were negroes. In Jacksonville, Fla., in 1899 there were 3683 arrests, of which 1919 were negroes. It is claimed that in Pennsylvania 16 % of the males and 34 % of the female prisoners are negroes. In the latter State only about 2 % of the entire population are negroes. In Chicago 10 % of the arrests are negroes, while they furnish only 1½ % of the population. He gives as reasons for the large percentage of criminals in the black race (1) slavery; (2) ignorance; (3) environment; and he believes that the best way to diminish crime in the colored race is by establishing a strong vagrancy law and reformatory schools for the children. He suggests the establishment of a State farm where the idle and the familiar figures in police courts should be put to work, paying each what his labor is worth above the cost of his maintenance. He states that the Convict Farm of Mississippi yields to the State \$200,000 yearly, as does also the Convict Farm of Arkansas.

Frederick L. Hoffman has collected statistics which go to show that **suicides in the United States are gradually increasing**. In a table comprising returns from 50 cities it is shown that the average mortality from suicide from 1891 to 1900 was at the rate of 15.7 per 100,000. During the year 1901 it was 16.6, showing an increase of 0.9 per 100,000. The rate was highest in St. Louis, where it was 25.7 per 100,000, and lowest in Fall River, Mass., where it was 2.9. The New York Life Insurance Co. have found that from 1843 to 1885, 1.9 % of all cases of death were from suicides. From 1886 to 1898 the mortality was 2.4 %. In commenting upon these statistics the "Medical Record"² believes that the wear and tear of modern life has a marked influence upon the increase of suicide, a fact which is clearly demonstrated by the great frequency of suicide in cities as compared with the country. It believes that alcohol increases the impulse toward suicide, and that there is, among certain races, an undeniable suicidal idiosyncrasy.

W. F. Drewry³ calls attention to the present **inadequate disposition of the criminal insane**. He believes that it is the duty of the State to provide some accommodation for this class of cases, and that it is preferable to have separate departments at the penitentiary rather than at the State hospital for the insane. He recommends the erection of a new building at the penitentiary or at the prison-farm, which shall be

¹ Med. News, Jan. 31, 1903.

² September 27, 1902.

³ Virginia Med. Semi-Monthly, Jan. 23, 1903.

constructed more on the hospital plan than after the idea of a prison. All the criminal insane who are now in the State hospital, the penitentiary, or the jails should be sent to this department.

The total number of inmates of the **Elmira Reformatory**¹ during 1902 was 2134. Of this number, 858 were admitted during the year. During this year 611 inmates were discharged. The death-rate has been markedly lowered, due to improvement in the treatment of the physical as well as of the mental states. Improvement in the general physique has increased the susceptibility of the subject to reformatory measures. Those sent to the Reformatory consist chiefly of the children of dissolute parents and who are brought up in squalor and dirt, and surrounded by conditions which are calculated to increase rather than ameliorate their unfortunate condition. They run away from home and become tramps, and as they are unfit to support themselves they soon violate the law and are sent either to prison or to the reformatory. The teaching and training consists of drills, instruction in trades, education in reading, writing, and arithmetic. There are 1100 to 1250 who receive daily instruction in the trade school. Photography, etching, applied electricity, chemical engineering, carpentry, brick-laying, building, printing, and book-binding are all taught. The moral and religious teaching is non-sectarian. There were 7 deaths in the institution during the year. It has been found that one-fifth of the inmates are so mentally defective that they are incapable of more than slight improvement, but the majority achieve a degree of skill which permits them after their discharge to take their places among competent workers in trades in the State.

Richard Webb, Esq.,² very intelligently and fully discusses the **legal tests of responsibility**. He is of the opinion that some definite and predetermined test should be established to fix the alleged incapacity of the accused. None so far has ever been discovered. It is with the border-line cases only that this test is of especial value. He states that the great difficulty is that there is an insufficient knowledge of insanity, and that it is impossible that a thorough knowledge will ever be gained. It has been held by the medical profession that a test of insanity has been set up by the courts, and this position has been objected to on the ground that it is for science and not for the courts to decide such questions. This cannot be said to be strictly true, for it is a question for the jury to decide whether a person is sane or insane. Even when insanity is proved, the question still remains, Is the respondent responsible? The present-day courts recognize two tests: the "right and wrong" test, and the "irresistible impulse" test. The argument in favor of the latter is that responsibility depends upon the existence of the intelligence and the will, and if either be absent, responsibility fails. The courts, however, with some exceptions, have generally maintained that the test of responsibility is the capacity of the accused to determine right and wrong at the time at which the act was committed, and rather to reject the doctrine of irresistible impulse.

¹ Lancet, May 30, 1903.

² Phila. Med. Jour., Jan. 24, 1903.

William Rollins¹ believes that **every person should be signalized on arriving at adult age.** He emphasizes the importance of accuracy of measurement of the Bertillon method of identification, and suggests that the *x-ray* photographs be also employed to accomplish this purpose. These photographs not only give the accurate length of the bone, but also show its structure. He claims that this method has an advantage over others in cases of burned or decomposed bodies. The angle at which the central ray strikes the object as well as the direction and distance of the source of light should be stated on the plate. He calls the apparatus that accomplishes this result the "orienter."

DIAGNOSIS OF THE ORIGIN OF BLOOD-STAINS.

Arthur J. Patek and William C. Bennett² have reviewed the literature of the **antiserum method of differentiating human blood from other blood**, and report the results of experiments which were made to determine the practicability of these tests. They examined in a murder case blood-stained chips of wood, pieces of plaster, clothing, and glass which were taken from the house of the accused. They injected subcutaneously pleuritic fluid to the amount of 10 cc. into a rabbit and withdrew the blood on the nineteenth day, with the result that a faint reaction was given with human blood. Again, 10 cc. of human serum was injected intraperitoneally at intervals of 10 days over a period of 2 months. Blood collected from these rabbits several days after the sixth injection was placed in a sterile glass jar upon ice and the serum removed by a pipet 24 hours later. To part of the serum chloroform was added, and to the remaining portion no preservative. The blood-serum of a control rabbit was treated in the same way. If the blood to be tested was fluid, it was first diluted with water and then with normal salt solution until it was of a pale pink color. This was divided into 2, 3, or 4 equal portions and 3 drops of the test and control serums added to each portion. They were then placed in an incubator at 35° C. When dry blood was tested, the stain was taken up in tap-water, and, if necessary, filtered. Then an equal quantity of double salt solution was added and this was treated like the control solution. They obtained positive reactions in 3 instances in the suspected murder case. Two of the stains were on wood and one on cloth. Only negative results were obtained when a very small amount of blood was used, which accounted for the failure, or it may have been that some of the stains were not human blood. The tables on pages 565 and 566 embody the results of their experiments.

E. N. Layton³ reviews the literature of **the medicolegal tests of blood-stains**, and reports the results of experiments made upon animals with the view of settling the following questions: "(1) A given stain having been proved to be blood by one of the absolute methods, . . . is it possible to prove whether or not the stain was made by human blood? (2) If so, is the proposed test always specific? (3) Is its accuracy

¹ Boston M. and S. Jour., May 7, 1903.

² Amer. Med., Sept. 6, 1902, p. 375.

³ Amer. Med., June 6, 1903, p. 913.

No.	BLOOD TESTED.	SERUM ADDED.	RESULT IN 1 HOUR OR LESS.
1	Fresh dried human.	H. R.*	Heavy flocculent precipitate.
2	" " "	H. R.	5 minutes, marked turbidity.
			15 " faint turbidity.
3	" " "	O.†	No change.
4	Fresh human.	O.	No change.
5	" "	H. R.	10 minutes, initial turbidity increased.
6	" "	H. R.	45 minutes, decided turbidity.
7	" "	O. R.‡	No change.
8	" "	C. H. R.§	Turbid.
9	" "	H. R.	Turbid.
10	" "	O. R.	No change.
11	" "	O.	No change.
12	" "	C. H. R.	Turbid.
13	" "	H. R.	Turbid.
14	" "	O. R.	No change.
15	" "	O.	No change.
16	" "	H. R.	Turbid.
17	" "	O. R.	No change.
18	" "	H. R.	Turbid.
19	" "	O. R.	No change.
20	" "	O.	No change.
21	Human, on paper.	H. R.	Turbid.
22	" "	O.	No change.
23	Human, on wood.	H. R.	Turbid.
24	" "	O.	No change.
25	Human, on cloth.	H. R.	Turbid.
26	" "	O.	No change.

* H. R.—Humanized rabbit.

† O.—Nothing added.

‡ O. R.—Ordinary rabbit.

§ C. H. R.—Humanized rabbit to which chloroform had been added.

BLOOD USED.	SERUM ADDED.			
	Human Rabbit.	Ordinary Rabbit.	Chloroform Human Rabbit.	Nothing.
Chicken	—	—		
Pigeon	—	—		
Dog	—	—	—	—
Turkey	—	—		
Ox	—	—		
Sheep.....	—	—		
Cat	—	—		
Mixed	—	—		
Pig	—	—	—	
Rabbit	—	—		
Human	—	—	+	
(Fresh blood, old blood on paper, glass, wood, and cloth).				

+ = Positive reaction. — = Negative reaction.

BLOOD FROM VARIOUS ARTICLES IN B—CASE.

No.	TAKEN FROM.	SERUM ADDED.	RESULT IN 1 HOUR OR LESS.
1	Step 2.	H. R.*	10 minutes, marked turbidity.
2	" 2.	O.†	10 minutes, no change.
3	" 9.	H. R.	No change, very dilute.
4	" 9.	O.	" " "
5	" 10.	C. H. R.‡	" " "
6	" 10.	O. R.§	" " "
7	Lower step.	H. R.	Turbid.
8	" "	O. R.	No change.
9	Towel.	H. R.	Initial turbidity increased.
10	"	O. R.	" " not increased.
11	Plaster 6.	H. R.	No change, very dilute.
12	" 6.	O. R.	" " "
13	" 6.	O.	" " "
14	Step 5.	H. R.	" " "
15	" 5.	O. R.	" " "
16	" 5.	O.	" " "

* H. R.—Humanized rabbit.

† O.—Nothing added.

‡ C. H. R.—Humanized rabbit to which chloroform has been added.

§ O. R.—Ordinary rabbit.

modified by the age of the stain or the mixture of other blood or foreign matter? (4) Is the process itself sufficiently accurate and invariable for medicolegal purposes?" He reports the following conclusions from his experiments: "(1) The reaction is caused by the development within the blood-serum of the injected animal of an antibody or a property or substance which causes a certain reaction with the serum homologous to the one injected. (2) The reaction does not occur when normal rabbit serum is used. (3) The reaction occurs much more rapidly, especially when dilute solutions are used, if the test is exposed to a temperature of 37° C., although it will occur at ordinary room-temperature. (4) An immediate result in the cold is obtainable by diluting only the blood tested, the test-serum being used pure. (5) The reaction is obtainable when using a dilution of the test-serum of 1 : 20,000, or of the blood tested of 1 : 1000. Hence, only a minute stain and a single drop of the test-serum are required for making the test. (6) The delicacy of the test is not altered by the admixture of other bloods or of other foreign material, except the albumin precipitants. (7) The presence or absence of mineral salts, such as copper sulfate, or of other precipitants of albumin, can be determined by the control tests. (8) The delicacy of the test is not materially altered by the age of the stain. (9) A differentiation from monkey blood is possible, and contamination with monkey blood can be excluded, first, by a great dilution of the blood tested and a dilution of the test-serum of 1 : 500, with incubation; second, by a great dilution of the blood tested, the test-serum being used pure, and the test made at room-temperature. (10) The test is specific, invariable, and therefore applicable to forensic use."

A. Robin¹ experimented with the view of determining whether **specific**

¹ Phila. Med. Jour., Dec. 20, 1902.

antisera for the detection of human blood could be preserved. To an active serum was added several drops of chloroform which was then kept in a dark closet for 4 weeks. At the end of this time the serum was found to have markedly deteriorated in its specificity. He concludes that the hanging-drop method has the advantage that the time of observation is shortened; that the method can be used with minute quantities; and greater accuracy can be obtained in the reaction.

MEDICOLEGAL TESTS.

D. J. McCarthy¹ describes a case of **paralysis of the arms** in a man of 58 who used his bare hands for cleansing photographic plates. A few days later the hands became painful, swollen, hard and white, and lost sensation. There developed right musculospiral paralysis. The examination did not show that sensation was lost in the arm and hand. There was at first increased galvanic irritability of the muscles, but later the muscles failed to contract to strong currents. The patient sued the company for damages, and a verdict was rendered in favor of the plaintiff, on whose behalf the testimony pointed to a diagnosis of **peripheral neuritis due to the immersion in fluids which probably contained hydrofluoric acid.** The experts for the defendant testified that it was a case of obscure intoxication, and that the disease was due to a central cause, either degeneration of the anterior horns of the spinal cord or possibly the roots, and that it antedated the acute local condition. Experimentally it was shown that when hydrofluoric acid was applied locally it caused degeneration in the deep nerves with a necrotic process in the subcutaneous tissues. When formalin was applied to the skin, there followed intense and extensive degeneration of the nerves, without a serious destruction of the superficial tissues. In applying strong solutions of carbolic acid the superficial tissues are involved, and only when these tissues are intensely affected do the subcutaneous and deep nerves degenerate.

MENTAL CONDITIONS.

S. D. Hopkins² reports an interesting case of **prolonged loss of memory** which occurred in a man of 34 who lived in New York. He had been drinking excessively for 6 months before the attack and had suffered from loss of memory for recent events. His memory for the events which occurred between July 4 and August 1 was entirely blank. Then for a very short time he remembered going to a club-house in New York city, after which, until September 21, he had absolutely no recollection of his actions. At this time, after experiencing a sensation as if one were drawing a cap from his head and face, he became conscious and found himself in Denver dressed in a jumper and overalls. The examination of the patient was entirely negative except in this respect.

¹ Med. Bull. of Univ. of Pa., March, 1903, p. 39.

² N. Y. Med. Jour., 1902, p. 367.

MEDICAL ETHICS.

M. Maygnier¹ reports the conclusions of a commission upon the question of **feticide**.² The commission concluded that when the life of a woman is placed in danger by pregnancy, the indication for induced abortion is indisputable. When a woman with an extremely narrow pelvis becomes pregnant and it would be impossible for the child to be born alive if the pregnancy were permitted to run its course, the mother should be instructed that she will have to undergo cesarean section at term, or permit the performance of an induced abortion. If the woman refuses to undergo the cesarean section, the physician has then the right to induce abortion, but to be on the safe side he should insist upon a consultation with one or two other physicians. The true object of the report was to decide upon the case of a woman who had arrived at term with a living fetus which could not be delivered spontaneously, and of which the deliverance could only be effected by the aid of operations such as symphyseotomy or cesarean section, on the one hand, or embryotomy on the other. Under the present surgical conditions symphyseotomy or cesarean section gives such results that the indications for feticide are exceptional. If a pregnant woman refuses to undergo cesarean section which was advised by her physician, and should desire embryotomy, what shall the physician do? He may refuse to sacrifice the life of the infant and retire from the case. When the case is urgent, however, and time is precious, and delay dangerous to the life of the mother, his duty is, in spite of his repugnance to the operation, to perform embryotomy. When the mother is unconscious and cannot decide for herself, the physician must consult the husband or her parents. He should act always with prudence and solicit the advice of a consultant before intervening. In the case in which the husband or the parents dissent from an operation the law does not give any more right to one than to another, and the physician can, without incurring responsibility, conform to the rule of conduct which is directed by science and his conscience.

The "British Medical Journal"³ is of the opinion that **medical men may, in some cases, without impropriety, take charge of cases already under the care of a fellow practitioner.** The patient has a right to select his own medical attendant and may change at will, and one physician may replace another without occasioning ground for complaint, the only condition being that the former physician shall be informed by either the patient or the patient's friends that his services are no longer needed. But under no circumstances can a man take charge of a case after he has been called in consultation, nor can he take a patient whom he has seen as a substitute during the illness.

MALPRACTICE.

Malpractice⁴ may be divided into two chief classes: civil and criminal. When a physician takes charge of a patient, he contracts that he has the

¹ Jour. de Méd. de Paris, Dec. 28, 1902.

² The commission consisted of Constant, Demange, Jacomy, Lutaud, Maygnier, Picqué, Roché, and Vibert.

³ November 29, 1902.

⁴ Medicolegal Bull., Dec., 1902.

requisite amount of skill to perform the duties of his profession properly. The reasonable and ordinary skill and knowledge which the law requires of a physician are that possessed by physicians practising in the neighborhood in the same line of work. A physician further contracts that he will use a reasonable degree of skill and knowledge, due care and diligence in the treatment of his patients, and that he will continue to attend them as long as his services are required. He cannot retire from a case until he has given due notice and allowed sufficient time to elapse for the patient to engage another physician. On the other hand, the patient may discharge his medical adviser without warning. The physician must give clear and explicit instructions; must follow recognized methods of practice; must be familiar with the recent advances in medicine; must employ the most improved of modern methods, although, on the other hand, the law holds him responsible for harm following the use of remedies which are untried. No court of last resort has passed upon the question of the propriety of employing the *x*-rays in therapeutic medicine. The physician must employ his best judgment, although this does not necessarily imply that it shall be infallible. The physician shall not be held responsible for untoward results when the patient does not follow advice given. The physician is not rendered exempt from responsibility when his services are given gratuitously. Medical experts are held responsible according to the opportunity to possess and use skill and care. When a patient accepts the services of a physician, he thereby contracts to pay, and this is entirely independent of the results of the treatment. When a certain amount has been agreed upon, this amount may be increased when the physician, discovering that the treatment will be more expensive and more difficult, explains this to the patient, and it is not necessary that any mention of the increase in the fee be made. The law recognizes contracts made on Sunday between physicians and patients. When medical services are rendered to a medical man, the implied promise to pay is offset by medical ethics. When a patient refuses to follow instructions of his physician, recovery for damages will thus be prevented.

MEDICAL EDUCATION AND MEDICAL LICENSES.

The Legislature of Maryland in 1902 passed an act providing for two separate examining boards, one representing the Medico-chirurgical Faculty of the State of Maryland, and one representing the Maryland State Homeopathic Medical Society.¹ The applicants may show a diploma from a regularly incorporated college in the United States which requires a 4 years' course of instruction, as defined by the American Medical College Association, or by the Intercollegiate Committee of the American Colleges of Homeopathy, or a license or diploma granting the right to practise medicine or surgery in a foreign country. These requirements, however, do not apply to one who has practised outside of the State for 3 years previous to the passage of this act, provided he was licensed in the place where he practised. Licensed practitioners of the

¹ Medicolegal Bull., Feb., 1903.

District of Columbia or other States in which the standard of requirements is as high as that laid down by the Maryland law may be granted licenses without an examination providing these States reciprocate the same privilege. The diplomas of graduates of foreign colleges in which the course required is not less than 4 years will be accepted without examination.

The Supreme Court of South Carolina holds, in the case of Moore vs. Napier and others,¹ that the petitioner who had received a diploma from the South Carolina College covering a course of only 3 years **could not demand from the Board of Medical Examiners a license** to practise medicine without undergoing an examination. The course was only 3 years in length when the petitioner matriculated in the South Carolina Medical College, but before receiving his diploma the course was increased to 4 years, commencing with the year 1901. This change was made for the purpose of enabling graduates to receive the benefit of the law published February 15, 1901, which exempted graduates from recognized colleges of which the course was 4 years. It claimed that to grant a writ of mandamus requiring the Board of Examiners to issue a license would be in violation of this act.

In the case of State vs. McKnight² the Supreme Court of North Carolina stated that the question was whether one who practises "**osteopathy**" is to be governed by the amendment of the laws of North Carolina which reads: "That any person who shall begin the practice of medicine or surgery in this State for a fee or reward after the passage of this Act, without first having obtained a license from the State Board of Examiners, shall not only not be entitled to sue for or recover before any court, any medical bill for services rendered in the practice of medicine or surgery, or any of the branches thereof, but shall also be guilty of a misdemeanor," etc. The jury decided that the defendant's treatment consisted in manipulating, kneading, flexing, and rubbing the body, and other mechanical measures, but not in the administration of drugs or medicines, and that he prescribed hypnotism and suggestion under hypnotism. On two occasions he had opened an abscess in the mouth but charged no fee. The Supreme Court believed that the defendant's practice could not be construed as being the practice of medicine or surgery, and therefore no license was required. The surgery had been without fee or reward, therefore an act of charity, and was accidental to the practice of osteopathy. It cannot be said that one practises medicine if he does not use drugs, medicines, or surgery. It concludes that osteopathy is not the practice of medicine or surgery as commonly understood. Osteopaths are liable both socially and criminally if there is any fraud or imposition or any injury resulting. No weight can be attached to the fact that the defendant had placed out a sign advertising himself as a "doctor," for it was shown that the title was given him by a college of osteopathy. There are also many kinds of doctors, such as doctors of law, divinity, medicine, and veterinary medicine.

¹ Jour. Am. Med. Assoc., Feb., 1903.

² Jour. Am. Med. Assoc., Nov. 15, 1902.

PUBLIC HYGIENE AND PREVENTIVE MEDICINE.

BY SAMUEL W. ABBOTT, M.D.,
OF BOSTON, MASS.

THE past year has been noted for continued progress in the study of infectious diseases and the methods of preventing their spread, especially of those diseases which are spread through the medium of insects or parasites.

Notwithstanding the existence during the year of a general epidemic of smallpox throughout the country, the greatest since that of 1872-73, but now fortunately nearly extinguished, the last year of which complete municipal records are available (1902) appears to have been a year of phenomenal good health, so far as can be judged from the death-rate. In some of the States in which vital statistics have been recorded for a long series of years, the death-rate fell in 1902 to a lower point than has ever been known in their history. How much of this is due to the intervention of man by preventive measures, and how much to other circumstances beyond his ken, cannot be told. It is safe to say, however, that all the money invested in producing municipal cleanliness, purity of water-supplies, food-inspection, and other preventive measures is returned manifold in the saving of human life.

Two items are suggested as worthy of future adoption in the field of preventive medicine: (1) Greater attention to vital statistics as furnishing the foundation or basis of knowledge relative to the effect of sanitary measures upon the health and lives of the people. The Census Office at Washington has taken a decided step in advance during the year, in the publication and distribution of several pamphlets calling the attention of medical men to this subject, and especially to the need of care in making certificates of death, and as to the necessity of efficient legislation upon this subject in order to bring about as far as is practicable uniformity of methods in the different States. (2) The need of greater attention to the subject of industrial hygiene. This subject is greatly neglected in this country, when compared with the work accomplished in the leading countries of Europe. The 25 or 30 millions of operatives in American factories, workshops, and mines, many of whom are subjected to processes of manufacture and of labor which are actively injurious to health, and which consequently tend to shorten life, should receive active and earnest attention both from the medical profession and from State legislatures, the objects in view being, first, to investigate the causes

and conditions which tend to produce ill health among workmen; and, second, to propose measures for the prevention of harm. The field is large, and thus far but little plowed, so far as American industries are concerned.

The death of Surgeon Walter Reed during the year removes a brilliant star from the ranks of workers in preventive medicine. His useful life, as well as those of Pasteur and Virchow and Pettenkofer and many others who have gone before, should prove a helpful stimulus to younger workers now occupied in the same field.

THE MANAGEMENT AND CONTROL OF INFECTIOUS DISEASES.

The Cost of Tuberculosis.—Bigg's¹ places the expense of tuberculosis to the people of the United States at \$330,000,000. He first calculated the loss to New York city by giving a value of \$1500 to each life at the average age at which deaths from tuberculosis occur. This makes a total value of the lives lost annually of \$15,000,000. But this is not all. For at least 9 months prior to death these patients cannot work, and the loss of service at \$1.00 a day, together with food, nursing, medicines, attendance, etc., at \$1.50 a day, results in a further loss of \$8,000,000, making a yearly loss to the city of \$23,000,000. For the whole country the 150,000 deaths from tuberculosis represent in the same way a yearly loss of \$330,000,000.

The Relation of Human to Bovine Tuberculosis.—Hamilton and Young,² referring to the noted expression of Koch at the British Congress in 1901 to the effect that he "felt justified in maintaining that human tuberculosis differs from bovine and cannot be transmitted to cattle," also expressing a wish that his experiments might be repeated by others in order that all doubt as to the correctness of his assertion might be removed, have performed a series of experiments by which they have reached the following conclusions: (1) Although human tubercle is probably not so virulent for the calf as that derived from bovines, yet it can be readily inoculated upon that animal. (2) This holds good whether the tubercle inoculated be derived from tuberculous lymph-glands, tuberculous lung, tuberculous sputum, or tuberculous urine. (3) It produces this positive result irrespective of whether it be introduced by feeding the animal with the tuberculous material, by subcutaneous inoculation upon a peripheral part, by respiring a spray containing the bacillus, or by injection into the venous system. (4) The organs most affected are those in immediate contact with the part operated upon. (5) The lymphatic system is constantly involved in the resulting tuberculosis. (6) When administered by the mouth, tubercular sputum induces an abdominal lymph-gland tuberculosis without necessarily the intestines being in any way involved. (7) When tuberculosis from a human source has been ingrafted upon a calf, it gains enormously in virulence by being

¹ Pamphlet published by Tuberculosis Committee of the Charity Organization Society.

² Public Health, Sept., 1903, p. 689.

reinoculated upon a second calf. (8) The morphologic characters of the bacillus may vary according to circumstances, and are no guide to the source of the organism under observation. (9) These facts go to favor the view that the human bacillus and that of bovines are identical, but modified somewhat by their environment. (10) These results are a direct contradiction of those alleged to have been obtained by Koch and Schutz.

Prevention of Tuberculosis in its Early Stage.—Renaut¹ recognizes the importance of beginning very early in the course of the disease systematic methods of prevention and cure, and for this reason he eulogizes the value of the system of antituberculous dispensaries recently established in the large cities of France, not as opposed to the treatment in sanatoriums, but as antecedent to such treatment.² Patients apply for advice and treatment at an earlier stage in the disease than those who are sent to the hospitals. They not only receive advice and treatment, but an official often accompanies the patient to his home and gives counsel as to the necessity of taking the proper measures for the prevention of harm to other members of the household.³

The Probable Extinction of Tuberculosis.—Hillier⁴ calls attention to the possible extinction of phthisis in a generation or more and presents a diagram in which the descending line for England shows a probability of such extinction about 1945-50, and in Prussia about 1925-30. A similar line for Massachusetts would indicate extinction about 1935. The death-rate from tuberculosis has fallen in England from about 24 per 10,000 of the living population in 1886, to 19 in 1900, and in Prussia there has been a more rapid fall, from 31 per 10,000 in 1886 to 21 in 1900. The death-rate from phthisis pulmonalis in Massachusetts has also fallen from 42.7 in 1853 to 17.9 in 1902. Hillier attributes this fall in Prussia to the following causes: (1) The discovery of the tubercle bacillus, and the spreading of the knowledge of the infectious character of phthisis, which Koch says has led to the taking of precautions, even among the lowest classes in Germany. (2) The greatly improved conditions of the working classes, brought about by the operation of the Workman's State Insurance Laws, the first of which, the Sick Insurance Law, came into existence in 1883. (3) The establishment of sanatoriums, but this is too recent in Prussia to have had much effect at present. For the purpose of promoting a more rapid extinction of this disease, Hillier recommends the enactment of a law having the following provisions: (1) Compulsory notification of phthisis. (2) Such a degree of isolation as is afforded by sanatoriums or special hospitals, or, if this is not practicable, strict sanitary supervision in the home. (3) Provision for increase of the staff of local health authorities to be specially devoted to the control of tuberculosis. (4) Authority for local health officers to provide special accommodation for cases of phthisis.

¹ Rev. d'Hygiène, July, 1903, p. 577.

² See YEAR-BOOK for 1902, Medical volume, p. 621.

³ See also two articles on the same subject by Calmette and Bernheim, Rev. d'Hygiène, 1901, p. 577, and 1903, p. 241.

⁴ Public Health, March, 1903, p. 301.

A Model Sanatorium.—Foulerton,¹ in a prize essay submitted in competition for the erection of a sanatorium for tuberculosis, gives the following liberal estimate of cost for an establishment capable of accommodating 100 patients—88 of the “necessitous” and 12 of the “well-to-do” classes.

Buildings, including drainage, and machinery, plant, fittings, etc., but not furniture.....	\$450,000.00
Furniture, including linen, etc.....	15,000.00
Road-making and laying out grounds.....	10,000.00
Farm buildings.....	50,000.00
Land (say 100 acres).....	50,000.00
	\$575,000.00
Balance left for endowment	425,000.00
	\$1,000,000.00
Income. 3 % of \$425,000	= \$12,750.00
Poorer patients @ \$2 per week or \$100 per year: $88 \times 100 =$	8,800.00
“Well-to-do” patients @ \$7.50 per week or \$390 per year: $12 \times 390 =$	4,680.00
	\$26,230.00

This, according to the writer, would give an average income of \$5 per patient per week, “which would probably be just sufficient for the ordinary expenses of the sanatorium.”

Eberth's Bacillus in the Blood in Typhoid Fever.—Courmont and Lesieur² demonstrated the presence of Eberth's bacillus in the blood in 37 cases, in all of which the attacks were of moderate severity, from the first few days up to the end of the third week. The retardation in the development of the cultures is due probably rather to the inhibitory action of the typhoid serum than to the small number of microbes in the blood. M. Widal, at the same meeting at which this paper was read, stated that he had systematically undertaken cultures of the blood from all typhoid patients under his care according to this method of Courmont, since it was first presented. He divided the cases into two categories: mild and severe. In 5 mild attacks the bacillus could not be isolated from the blood when the examination was made from the fifth to the twelfth day of the disease. In 20 cases of moderate severity in which the blood was examined from the fifth to the fifteenth day of the disease the bacillus was found in 17 instances. Agglutination was observed in all the cases. It was not possible to isolate the bacillus in all cases, but it was found occasionally in the first days of illness. This method is valuable for diagnosis when the serum reaction is delayed. In the most severe attacks infection is not localized in the bowels, but the bacillus becomes disseminated in the blood as in septicemia.³

Oysters and Typhoid Fever.—In an examination of the population of the English district of Southend-on-Sea, Nash⁴ found in a population of 33,000 that 250 were regular shellfish-eaters all the year round, this

¹ Public Health, March, 1903, p. 326.

² Bull. et mem. de la soc. méd. de Hôp. de Paris, 19, 3d series, 1902, p. 1063.

³ See also discussion by Widal on the same subject in same journal, p. 1066.

⁴ Med. Mag., Aug., 1903, p. 564.

number increasing in the oyster season to 1500. Among the shellfish-eating portion the typhoid attack-rate was 51.25 per 1000, and in the non-shellfish-eating portion it was only 0.75 per 1000. Among employees of shellfish dealers the percentage of attack was 160 per 1000.

Distribution of the Diphtheria Bacillus and that of Hofmann.—In a similar line of work with that of the Massachusetts Committee, referred to in the last volume of the YEAR-BOOK, page 614, Medical volume, Graham-Smith¹ concludes as follows: (1) Diphtheria bacilli have been found in a considerable proportion of persons who have come in contact with cases of diphtheria or with other infected persons. (2) Such persons have been shown to be a grave danger to public health, especially when frequenting schools or institutions, and to constitute the usual channel by which the disease is spread. (3) Very satisfactory results have followed on the isolation of convalescents from the disease and of infected "contacts," where two or more consecutive negative examinations have been required before release. (4) Carefully conducted investigations among healthy persons, who have not at a recent date been in contact with diphtheria cases or infected "contacts," have shown that virulent diphtheria bacilli are very seldom (3 examples among 1511 persons) present in the mouths of the normal population. This fact renders the discovery and isolation of infected persons a practicable possibility, and offers a fair prospect of discovering and isolating the majority of them in any outbreak. (5) Diphtheria bacilli are usually distinguishable on morphologic and cultural grounds, but whenever possible it is desirable that their virulence should be tested. (6) The bacillus of Hofmann is innocuous to man, and is a very common organism in the mouths of the poorer classes. The distribution of this bacillus points to the conclusion that it is carried from mouth to mouth in the same way as the diphtheria bacillus, and therefore its widespread prevalence in schools attended by poorer children is significant, as showing how widely spread and uncontrollable an outbreak of diphtheria may become unless measures are early taken to deal with infected contacts.

The Rarity of Rabies in Constantinople.—Remlinger² controverts a popular opinion that rabies does not occur among the vagrant street-dogs of Constantinople and that these dogs are immune. By experiment upon 19 dogs he succeeded in inoculating 14, who died of rabies. Death occurred about the twenty-first day after inoculation, on an average. The form in which the disease appears among these dogs, however, is the paralytic, and not the furious form. These dogs are of a special type, apparently between the wolf and jackal, while the dogs of other Turkish districts, Smyrna, Salonica, etc., are of a very different type. The author presents the results of the operations of the Pasteur Institute at Constantinople, which show that during the two years ended November 15, 1902, 1322 persons had applied for treatment for dog-bites, of whom 317 were from Constantinople and 1005 from other Turkish districts. He does not attempt to explain the difference in the type of the disease.

The Vitality of Pathogenic Bacteria in Minute Particles of Water

¹ Jour. of Hyg., April, 1903, p. 253.

² Rev. d'Hygiène, April, 1903, p. 309.

and in Dust Particles.—Kirstein's¹ object in experimenting was to determine the length of time during which pathogenic bacteria which are associated with dust or minute drops of moisture may remain alive in rooms having ordinary illumination with diffused sunlight. Experiments with tubercle bacilli which had been thrown out in a spray, and collected 8 days after the spraying, showed that they had lost their virulence, but retained it at least 4 days. It was argued that the variation in results obtained in different observers was due to the fact that the tubercle bacilli were encased in drops of moisture or sputum of very different size in different experiments. Where tubercle bacilli were protected from the action of diffuse sunlight and desiccation in particles of sputum of considerable size, the organisms preserved their vitality for 3 months or more. Similar results were found in experimenting with the bacilli of fowl cholera and with a number of staphylococci and streptococci.

The Bacteriology of Bank-notes.—On account of the liberal use of bank-notes of small denominations in Greece, Cumulis² submitted notes to experiment, and came to the following conclusions: (1) When the cholera spirillum was scattered upon a dirty bank-note and exposed to dry air, the spirillum died in 15 to 20 minutes. (2) On a clean note, covered with glass, but exposed to daylight, it lived 40 minutes. (3) On a note placed in an envelope the life of the spirillum may be prolonged to 60 minutes, but not more. Koch and Kitasato found that the cholera spirillum lived as long as 3 hours when dried in air. Cumulis explains this by the facts that their experiments were made on glass and not on paper, and in air more moist than that of Greece.

Vaccination.—The Incorporated Society of Medical Officers of Health, at its meetings February 13 and March 13, 1903,³ adopted certain resolutions relative to vaccination which are of general interest, portions of which are as follows: (1) It is expedient, in the interests of children as well as of the community at large, that the present statutory enactments requiring the vaccination of children in infancy should be maintained. (2) That any relief from these requirements which Parliament, when considering the Vaccination Act of 1898, may see fit to give should be given by an extension of the existing provisions of the law empowering magistrates to suspend vaccination for a definite period, and not by unlimited exemption, as at present. (3) That such postponement should not be for a longer period than 4 years, when the requirements of the law should automatically revive, subject to further postponement to the age of 12 years (or to an earlier age in case of prevalence, in the neighbourhood of the child, of epidemic smallpox) in case of the renewed objection of the parent, and that at this latter age all children who have not been vaccinated efficiently within 5 years shall be required to be vaccinated or revaccinated, as the case may be. (4) That the Local Government Board should have the power, on the occurrence of smallpox in any locality, to make an order requiring the children residing therein to be

¹ Zeit. Hyg. u. Infekionskrank., 39, 1902, No. 1.

² Med. Mag., Aug., 1903, p. 582.

³ Public Health, April, 1903, p. 425.

revaccinated at an earlier age than 12 years during such period as the Board may deem necessary. (5) That all persons who have been in contact with a case of smallpox should be required to be vaccinated or revaccinated forthwith, if in the opinion of the Medical Officer of Health such vaccination or revaccination is necessary. Persons occupying the same ward in a workhouse or lodging in a common lodging-house in which a case of smallpox occurs should be deemed to be in contact. . . . (8) That sanitary authorities should be empowered to expend public funds in promoting vaccination and revaccination whenever their districts are visited by or threatened with smallpox. (9) That a minimum standard of vaccination and of revaccination should be prescribed by the Local Government Board, such standard to state the number, area, and description of marks to be produced. (10) That the L. G. B. should prescribe forms of certificate for vaccination and revaccination which, when filled, should state the results obtained as to the number, area, and description of marks produced. (11) That every registered practitioner giving a certificate of vaccination or revaccination should do so by properly filling the form prescribed. (12) That calf-lymph guaranteed by the L. G. B.¹ should be supplied on demand to every registered medical practitioner. (13) That stations for the preparation of vaccine should be established under Government supervision in the large provincial centers. . . . (15) That a medical officer of health should be given power to detain contacts under observation. (16) That medical officers of health should have power to cause to be vaccinated or revaccinated contacts at the expense of the sanitary authority, or, in emergency, himself to vaccinate such contacts. (17) That a penalty should be provided against false information being given by any person in connection with an outbreak of smallpox. (18) That in the opinion of the society all vagrants should be required to be vaccinated, unless they can show the marks of recent vaccination, or produce a certificate of revaccination.

Compulsory Vaccination in France.—Bluzet and Martin² state that by a general Health Act of 1902, vaccination and revaccination became compulsory in France in February, 1903. By the terms of this law vaccination is required during the first year of life, and revaccination during the eleventh and the twenty-first years. The parents or guardians are held personally responsible for the execution of the provisions of the statute. Regulations, to be made according to advice given by the Academy of Medicine and the Consulting Committee of Public Health, will designate the methods of procedure for carrying out the provisions of this Act. These regulations, as published in February, 1903, comprise in brief the following provisions: (1) Vaccination to be exclusively with animal lymph. Vaccination direct from heifer to arm to be prepared in those cities where it is practicable. Otherwise with glycerinated pulp. (2) The preparation of vaccine lymph to be under the charge of the State. Not to be used when over 3 months old. Vaccinating physicians

¹ The Local Government Board has the powers of a Central Board of Health.

² Rev. d'Hygiène, Feb. 20, 1903, p. 109.

to keep registers to be used and all items of importance properly entered at each vaccination. (3) The vaccinal service to be organized upon a uniform plan throughout the country. (4) The Academy of Medicine, which has for many years performed a worthy voluntary service, to have charge: (a) of the maintenance of investigations relating to the best vaccinal stocks and the distribution of the same; (b) of the improvement of the modes of production and of vaccination; (c) of the examination of the vaccine offered for sale. The Academy is to submit an annual report upon the vaccinal service and upon the number of cases of smallpox occurring in the country. (5) One or more annual séances to be held in each commune for the purpose of affording gratuitous vaccination. Parents required to furnish information as to their children who are subject to vaccination or revaccination. (6) Vaccinators to be appointed by proper authority. Private physicians may be employed when preferred. (7) Vaccinations are not to be performed in a district where an infectious disease (other than smallpox) is prevailing or threatening to become epidemic. Subjects for vaccination living in a house in which an infectious disease exists are to be vaccinated separately and not at the regular vaccinal séance. (8) Lists of persons subject to vaccination to be made. (9) These lists to contain dates and results of vaccination. (10) Provision made for postponement on account of condition of health of the subject. (11) Investigations to be made when an unusual number of vaccinations prove unsuccessful. (12) Provision for repeated vaccinations in case of non-success. (13) Provision made for inspection and issue of certificates. (14) The lists of persons subject to vaccination comprise: *For primary vaccination:* (a) All children born in the commune and borne upon the civil registration lists who are between 3 months and 1 year old on the day of séance; (b) infants of the same age, born elsewhere, but residing in the commune; (c) older children who for some reason have escaped vaccination; (d) those who have been vaccinated without success. *For the first revaccination:* This list comprises all children, according to lists furnished by the public and private school authorities, who are enrolled in the schools and have become 11 years old, and those of any age who have submitted to neither vaccination nor revaccinations. Children who receive instruction at home are embraced in the same condition. *For the second revaccination:* This list embraces all persons who have attained their twentieth year and are living in the commune. (15) Provides for the publication of bulletins of information. (16) Relates to the sanitary condition of the room or hall used for vaccination. (17) Children to be brought for vaccination and kept afterward in a scrupulously clean condition. (18) Children to be carefully examined and their parents questioned as to their health before vaccination is performed. (19) The operation to be considered as a surgical one and having care taken to avoid infection. (20) Inspection to be made on the seventh day after vaccination. Provision for exceptions. (21) The responsibility of parents, guardians, and others. (22) Reports to be made of vaccinations and violations of the law. (23) Foreigners and their children to be subject to the law.

Bacteriologic Impurities of Vaccine Lymph.—Rosenau¹ presents the results of an experimental study conducted during the winter of 1901-02, the spring of 1902, and in November and December, 1902, in three series, upon the bacteriologic quality of vaccine lymph obtained in open market, the product of 10 different producers, with the following results: Out of 190 dry points an average of 4354 bacteria per point was found, in one as high as 44,000 organisms. Of 244 tubes of glycerinated lymph, an average of 1724 bacteria per tube was found. One had 30,000. Pus cocci were found in each form of lymph. Some of the vaccine sold in the winter of 1901-02 contained an excessive number of bacteria, which decreased after a few weeks, indicating the sale of a "green" or "unripe" product. Too much confidence was placed by producers in the germicidal power of glycerin. After calling attention to this point, there was a marked improvement, the average number of bacteria per tube of glycerinated lymph falling from 4698 in the winter samples to 1058 in the samples obtained in the spring. In the following winter (November and December, 1902) the average had fallen to 29 per tube. Glycerinated lymph properly prepared, and kept sufficiently long, is freer from impurities than dry points made with fresh lymph. There is practically no difference between the glycerinated lymph dried upon points, and that which is hermetically sealed in tubes, so far as bacteriologic impurity is concerned. Experiments were also made with reference to the existence of tetanus in vaccine, with the following results: No tetanus organisms were found in any of the samples examined. Tetanus spores, however, may live a long time in vaccine lymph; the longest period observed by experiment was 355 days. Tetanus may become a contaminating element of vaccine before it leaves the heifer, provided the germ is present in the stable surroundings of the animal. Tetanus added to glycerinated lymph gradually loses its virulence both in tubes and on points, but the spores are not necessarily dead. These spores die more quickly in the lymph dried on points than in the glycerinated tubes. Large quantities of tetanus spores introduced into glycerinated virus remain alive and active over a year. Very small amounts lost their virulence, in one instance in 1 month, and failed to grow in bouillon in 2 months. But small amounts may remain active for longer periods.

Protection of Vaccinated Animals.—Pfuhl² examined samples of vaccine lymph at the vaccine station in Hanover bacteriologically for the purpose of determining the effect of the use of tegmin bandages for the protection of the vesicles in vaccinated animals. These examinations showed great differences in the lymph taken from animals where the tegmin bandages were used, compared with those from other animals, but the difference became less when the lymph was examined after longer intervals.

Smallpox.³—Decision of Court of Appeal, English, March 2, 1903.

¹ Bulletin No. 12, Hygienic Laboratory, March, 1903, Washington, D. C.

² Med. Statistische Mitteil. aus dem Kais. Gesundheitsamt, 6, p. 166.

³ Public Health, April, 1903, p. 408.

Negligence; wrongfully certifying smallpox; cause of action. A good cause of action is disclosed when it is alleged that a medical man wrongfully and negligently certified a case to be smallpox, and that the plaintiff, who as mother of the patient had called in the doctor, had in consequence suffered injury to her business.

Flies and Typhoid Fever and Summer Diarrhea.—Martin¹ says: "Each succeeding year confirms my observation of 1898 that the annual epidemic of diarrhea and of typhoid is connected with the appearance of the common house-fly, which becomes very numerous at the beginning of July, and breeds chiefly in privy-middens. The increase and decrease of the annual diarrhea and typhoid epidemic can be foretold with a great degree of accuracy, an increase in the diarrhea cases occurring in a week, and typhoid notifications in 3 or 4 weeks after an increase in the number of flies is observed. The annual epidemics of these two diseases begin and end with the appearance and disappearance of the domestic fly."

Epidemic Diarrhea, Municipal Scavenging, Rainfall, and Temperature.—Newsholme² does not agree with Bullard that temperature is the chief controlling element in the causation of epidemic diarrhea, but considers that rainfall exercises a more important influence. The highest number of deaths from diarrhea in Brighton in any one week, in 1902, did not occur in the week in which the four-feet earth thermometer attained its mean weekly maximum, but 3 weeks later. The key to this anomaly is found in the fact that in each week of the third quarter of 1902 more or less rainfall occurred. The temperature conditions were favorable to diarrhea, but the rainfall prevented it. The facts for the year justify the conclusion that rainfall is more important than temperature in relation to epidemic diarrhea. For this reason he believes that when the natural watering by rain is deficient, it should be replaced by municipal watering. The weekly watering of the streets, especially of the gutters in the narrow streets occupied by the poor, would go far toward reducing the diarrheal death-rate. Peck,³ Health Officer of Chesterfield, confirms the foregoing statement of Newsholme by observations of similar character.

The Factors which Determine the Local Influence of Fatal Infantile Diarrhea.—Richards⁴ concludes from observations in several English localities: (1) That fatal infantile diarrhea is usually a form of food-poisoning. (2) That infection usually takes place at the house. (3) That urban conditions are chiefly hazardous from the amount of polluted soil found in the roads and yards of urban districts. (4) That infinite care is needed if babies are to be hand-fed in towns. (5) That practical preventive measures should include: (a) impermeable roads with efficient channeling; (b) copious watering of roads; (c) education of mothers as to the necessity of scrupulous cleanliness; (d) the co-operation or municipal provision of specially prepared modified milk,

¹ Public Health, Aug., 1903, 652.

² Annual Health Report for Brighton, England, for 1902.

³ Annual Health Report, 1902.

⁴ Jour. of Hyg., July, 1903, p. 325.

which should be sterilized during the diarrhea season; (e) a more efficient control of the milk trade with special reference to the provision of cooled, approximately sterile milk from healthy cows; and (f) the provision of houses which shall be sufficiently convenient to allow of their being cleansed with the least possible expenditure of energy. See also Delepine¹ on food-poisoning and epidemic diarrhea.

The Destruction of Mosquitos.—Tedaldi² contributes the results of experiments made to determine the best substances for the destruction of mosquitos and their larvæ. He first employed alkaloids (nicotin and coniin), but the results were not important. Infusions of various plants were also employed. A 4 % infusion of the leaves of *Conium maculatum* killed larvæ in about 20 hours. Infusions of chrysanthemum flowers proved more active. A 5 % solution of common salt killed larvæ in 10 hours, but this is more than twice the strength of sea-water. Better results were obtained with culicin, an English product, a violet powder, having the odor of hay. A 1 % solution of this substance destroyed larvæ in 15 minutes. They were also killed in 72 hours by a 0.008 % solution. The larvicide recommended by Celli appears to be more efficient than either of the foregoing, since it destroys larvæ in a solution of 0.0007 per 1000.

Prevention of Malaria.—Manson³ furnishes a paper upon the practical measures for the prevention of malaria, of which the following are the principal points: (1) Destruction of the parasite in man by the use of quinin. (2) Prevention, by mechanical means, of mosquitos gaining access to human beings. (3) Separation of the sick from the well. (4) Suppression of mosquitos. (5) Popular education upon this subject.

The Structure and Biology of Anopheles.—See paper by Nuttall and Shipley in "Journal of Hygiene."⁴

Vessels as Carriers of Mosquitos.—Grubbs⁵ contributes the results of observations on 82 vessels (78 sailing ships and 4 steamers). Observations were made (1) on the length of time after leaving infected ports vessels may develop yellow fever; (2) experiments with mosquitos under artificial conditions made to simulate as much as possible those of nature; (3) actual observations of vessels arriving from ports at the time infected or where the presence of mosquitos (*Stegomyia fasciata*) render them liable to infection. Examinations were made at the quarantine station, Ship Island, where no stegomyiae have been found. Each captain was asked the following questions: (1) Were there any mosquitos on board on your outward voyage, consisting of . . . days? (2) If so, did they come aboard before departure from home port or at sea, and under what circumstances? (3) Were there any mosquitos on board at your destination or on homeward voyage? (4) If in port, (a) how far were you from shore? (b) Prevailing wind and weather? (5) If on homeward voyage, consisting of . . . days—(a)

¹ Jour. of Hyg., Jan., 1903, p. 68.

² Atti della Societa per gli studi della malaria, 3, 1902, p. 102.

³ Jour. of the Sanitary Institute, July, 1902.

⁴ April, 1903, p. 166.

⁵ Bulletin No. 11, Yellow Fever Institute, March, 1903.

Were they from port? (b) Did they come aboard at sea, on what day, and how far were you from land? (c) Were there wiggler in your tanks at any time? On 65 vessels there had been no mosquitos at any time. Of the remaining 17, 5 had mosquitos on board at the ports of departure, 2 were rid of them as soon as they were at sea, 3 others carried them 2 days and were no more troubled, except one schooner, on which they reappeared in quantities 5 days before she reached port, when she was 20 miles from shore. Nine sailing vessels, having no mosquitos on board before sailing, had them appear at sea, in one case from the water casks. But in the other instances they probably came from shore at distances varying from 2 to 20 miles. They were all mosquitos of the common variety (*Culex*). *Stegomyia* were found on board and identified in the remaining 3 cases, in one case probably remaining on board after a voyage of 15 days from Vera Cruz, where they came on board in large numbers, the vessel being moored $\frac{1}{2}$ mile from shore. Another schooner arrived 13 days from Vera Cruz with mosquitos on board, and a third 22 days from Vera Cruz, where she had one case of yellow fever on board. This vessel lay $\frac{3}{4}$ of a mile from an infected prison and near an infected vessel. Mosquitos were abundant throughout the ship, and there were many in the water-tanks. The possibility of a vessel becoming infected when moored at a distance from the shore is contrary to the early theories in regard to yellow fever, but is proved by this observation.

The Spread of Yellow Fever.—The following resolutions¹ were passed by the Epidemiological Society of Great Britain at a recent session: (1) "That since the mode of infection of yellow fever has been proved beyond all question to be due to the agency of the infected mosquitos (*Stegomyia fasciata*), which it is known can be conveyed in ships, and still retain their infectivity for weeks, the prospect of the introduction of the disease to Eastern countries is a real danger." (2) "That it is desirable that a representation concerning the danger of the introduction of yellow fever to the East, in consequence of the rapid and increased communication between the yellow fever area of the West Indies and the ports of Japan, China, Malaya, Singapore, the Philippines, Borneo, Australia, India, and Ceylon, be made to the Governments of the countries interested in these parts of the world."

The Parasites of the Rat in the Transmission of the Plague.—Gauthier and Raybaud² report the results of numerous experiments, from which they conclude that the parasitic transmission of plague (by fleas) from rat to rat is possible. They also infer that these fleas may transmit the disease from rats to men, because the fleas collected from rats readily bite men. These experiments confirm the theory published by Simond, and indicate the methods to be employed for preventing the spread of the disease. See also the experience of Tira-boschi³ relative to the species of fleas which infest rats and mice, and their power of infecting men.

DESTRUCTION OF RATS FOR THE PREVENTION OF THE SPREAD OF PLAGUE.

¹ Public Health, Aug., 1903, p. 677.

² Rev. d'Hygiène, May, 1903, p. 426.

³ Il policlinico, supplemento settimanale, 1902, p. 1569.

—Jacques,¹ Health Officer of Marseilles, states that 10,054 rats were taken from 555 ships arriving at Marseilles from plague-stricken countries, and that 38,207 rats had been destroyed on the same ships during the voyage in one year. This experience, together with the reluctance of merchants to submit cargoes of tea, coffee, and valuable fabrics to the sulfur process, led the author to adopt a new and improved method of destruction, by a process of carbonication, as the author terms it. For this purpose a scow or barge is fitted with a battery of iron tubes of liquid carbonic acid. These are connected with a tube which leads to the ship and terminates in 4 smaller tubes leading to different parts of the hold. The hatches are closed and a sufficient amount of gas is conducted into the ship to amount to about 30 % of the cubic capacity of the hold. The gas was withdrawn by means of a ventilating wheel or blower. Experiments with rats distributed in cages demonstrated the efficiency of the apparatus. The cargoes were not disturbed nor injured.

DISINFECTION.

A Van for the Carriage of Articles to the Disinfecting Station.

—Bishop,² Health Officer of Guernsey, describes a van which obviates the necessity of having two carriages for infected articles, one for taking them to the disinfecter and the other to take them away. It consists of an iron cylinder which is of such size and shape that it will just allow of its entrance into the disinfecter. Doors are fitted at each end, easily removable, but allowing the container to be hermetically sealed by means of thumb-screws. This cylinder is mounted on 4 small flanged wheels, and the van has 4 wheels, the driving seat accommodating 3 men, with a space underneath for the sprayer, etc. On arrival at the disinfecting station the van is backed up to the disinfecter on the "infected side," the doors removed from the container, and placed inside, the apparatus is run in, the doors of the disinfecter are closed, and the container sterilized in the ordinary way. When the process is completed the doors are opened on the "uninfected side" and the carriage brought round to receive the container. The van is of light draft and adapted to hilly districts.

Disinfecting Wall Paints, with Special Reference to Tuberculosis.—Rabinowitsch³ says that it would seem that there are few records of recent experiments with respect to the disinfecting value of the various paints, considered with reference to their action upon the pathogenic germs which are to be found both in the dwellings of the healthy and in buildings set apart for diseased persons. It is true that Deycke investigated, during the course of the year 1898, certain colors in oil, lime, and size, and two new paints, prepared by the Hamburg Amphibolin Paint Company, with respect to their disinfecting properties, and ascertained that while there were noteworthy differences in the action of the various colors, the lime and distemper washes gave

¹ Rev. d'Hygiène, Feb., 1903, p. 120.

² Public Health, Aug., 1903, p. 666.

³ Zeit. f. Hyg., xl, 1902, p. 529.

the poorest results. Special attention is here directed to the researches of Heimes, Bosco, and Jacobitz, who have likewise conducted tests of the action of various washes, paints, and coloring-matters used upon wall-surfaces in respect to certain disease germs, and have examined the effect upon the vitality and the virulence of microorganisms exposed on dry or damp walls painted in different ways. The last-named writer found that certain so-called "porcelain enamel paints" were fatal to the bacilli of cholera, diphtheria, and typhoid fever in from 4 to 8 hours, staphylococci and streptococci were killed in 12 hours, but anthrax spores were only destroyed by one month's exposure. Rabinowitsch brings the results of these investigations, together with her own tests, into tabular form. The tests in the present instance had special reference to the action of all these different paints and color-washes upon the bacilli of tuberculosis, which are well known to exceed most other pathogenic germs in vitality, and are so readily distributed in the form of fine spray caused by sneezing and coughing. They may thus become deposited on walls, giving rise in this way to infection. The coloring-matters tested were 8 in number, and were applied to pieces of wood about 8 inches square, in even washes or coats. After having been allowed ample time to dry, they were coated with tuberculous sputum under precautions which are here explained. The results are set forth in tables, and show that certain of the special disinfecting paints, owing mainly to their chemical composition, have a powerful action upon the disease germs, and retain their germicide properties unimpaired for many months.

The Value of Sulfurous Acid as a Disinfectant.—Calmette and Rolants¹ discuss the power of sulfurous acid gas as a disinfectant with regard to its strength or concentration in the place to be disinfected, its penetrating power, and its efficiency to destroy different microbes. Two methods of use are mentioned, free burning in the open air, and by the use of the Clayton furnace. The authors conclude with Vallin, Dujardin-Beaumetz, Pasteur, Roux and others, that it is a very efficient disinfectant. See also paper by David and Duvian² on disinfection of ships.

The Standardization of Disinfectants.—Rideal and Walker³ say the makers of genuine disinfectants have to compete with others whose preparations are not only worthless, but actually dangerous, while the use of such products gives rise to a false sense of security. The public should know that disinfection—the killing of disease germs—is by no means a simple operation, and the control of disease by this means should form a part of the routine work in every sanitary area under the direction of the board of health. He therefore argues for a bacteriologic test, the details of procedure to be agreed upon beforehand by different investigations, the following factors to be considered: (1) Time; (2) age of culture; (3) choice of medium; (4) temperature of incubation; (5) temperature of medication; (6) variations in vital resistance of same

¹ Rev. d'Hygiène, May, 1903, p. 385. ² Rev. d'Hygiène, June, 1903, p. 500.

³ Jour. of Sanitary Institute, paper read at Congress, July, 1903.

species; (7) variations in vital resistance of different species; (8) proportion of culture to disinfectant. He suggests pure phenol as a standard, since it has marked advantages over a metallic salt. Similar work¹ has been accomplished by the American Public Health Association.

INDUSTRIAL HYGIENE.

The Ventilation of Bake-houses.²—The Home Secretary of England proposes to raise the cubic air space per worker in bakeries from 250 cubic feet to 500 cubic feet under the Factory and Workshops Act of 1901, because the work carried on is laborious, the temperature high, and the air consequently impure. To these reasons may be added the general use of gaslight, the evolution of steam, and the products of fermentation in baking. The bakers have replied (1) that the ordinary work is not laborious, but varied and intermittent. (2) The temperature averages 76° to 85° F. in summer, and 56° to 65° in winter, and these are not excessive. (3) Of the bake-houses, 90 % are in use only 12 hours in the day. In cases where the work is continuous night and day, they think the requirement should be 400 feet per capita. (4) They draw attention to the committee's report as being favorable to the quality of the air in bake-houses. (5) That the existing law is sufficient to insure good ventilation. (6) The process of fermentation now takes only 5 hours, where it formerly took 12 to 15 hours, consequently ill effects are diminished. (7) The use of gas in bake-houses is small compared with that in other workshops. In many the work is conducted by day, and electricity is superseding the use of gas. (8) The average life of the operative baker has improved, as shown by statistics. (9) The increase of cubic air space per worker would compel many employers to work their men in two shifts continuously night and day.

Ventilation of Factories and Workshops.—Public Health³ vigorously opposes the recommendation of the parliamentary committee to extend the limit of carbonic acid in the air of factories and workshops from 9 per 10,000 (a standard which had been adopted by the Home Secretary) to 14 volumes per 10,000 for all factories and workshops, including artificially humidified factories, and that this standard should be lowered to 20 volumes per 10,000 "after dark or before the first hour after daylight" when gas or oil is used for lighting. The Society of Medical Officers of Health of Great Britain, at a meeting held July 22, 1903, adopted a series of resolutions condemning such proposed lowering of the standard of ventilation for factories and expressing their belief that such action "would practically render all attempts at securing efficient ventilation nugatory."

The Hygiene of Flax-spinning.—Glibert⁴ presents many interesting facts about the flax-spinners of Belgium, 12,275 in number. He cites two principal causes of harm in this industry; the depressing effect of

¹ Trans. Am. Pub. Health Assoc., vol. 27, p. 247.

² Public Health, April, 1903, p. 376. ³ Editorial, Sept., 1903, pp. 686 and 731

⁴ Etude professionnelle, Bruxelles, 1902.

high temperature, with a condition of humidity almost amounting to saturation, together with an abundant evolution of dust. The functions of the liver and kidneys appear to be interfered with, and different kinds of skin eruptions are frequent. The harmful action of the dust appears to be due to its richness in silicates, which are most abundant in the stem of the plant. The measures of prevention especially relate to the age of admission, hours of work, night-work, working by pregnant women, methods of ventilation, use of respirators, and personal cleanliness of operatives, especially by bathing.

Lead-poisoning in Earthenware and China Works.—While it has been for several years incumbent upon physicians in England to notify the sanitary authorities of the existence of cases of infectious disease, a recent law has also required the notification of cases of lead-poisoning occurring in factories and workshops. A report made by Mr. Thomas Cochrane to the House of Commons, April 1, 1903, presents the following items: The number of cases in the several classes of works devoted to the manufacture of earthenware and china was 249 in 1899, 200 in 1900, 106 in 1901, and 87 in 1902, most of which occurred in the North Staffordshire Potteries district. For all other industries under the Factory and Workshop Act, the cases of lead-poisoning were as follows in the same years: In 1899, 1009; in 1900, 858; in 1901, 757; and in 1902, 542. The figures for 1899 included painters and plumbers. In the other years they are not included. The predominant symptoms among those attacked were as follows, in the order of their frequency: digestive, anemic, headache, paretic, rheumatic, encephalopathic, and uterine. [About one-third of the employees were women.] The certifying surgeons had the power to suspend employees from work for moral reasons, and on this account 123 were suspended in 1899, 94 in 1900, 82 in 1901, and 68 in 1902. Of the persons thus suspended from work over 85 % were women. The whole number of persons employed in the manufacture of earthenware and china in the North Staffordshire district was about 46,000, of whom about 4700 are exposed to lead-poisoning.

Gold Miner's Consumption.—Oliver¹ describes a form of phthisis in gold miners which resembles that of masons and stone-cutters. It is attended with cough, but rarely with hemorrhage. There is no thoracic pain, but a feeling of constriction in the chest. The appetite is lost, and emaciation supervenes. Slight elevation of temperature occurs. Night-sweats are rare. The author has not been able to detect the tubercle bacillus. Anderson and Delaval confirm the observations of Oliver.

Uncinariasis in Miners.—The International Congress of Hygiene at Brussels² voted in favor of: (1) Complete medical inspection. (2) Declaration of cases. (3) Provision of suitable latrines, both above and below ground, and of dressing-rooms and baths. (4) Cleansing of the soil and ventilation. It may be noted that disinfection—in Germany with milk of lime (whitewash) and in Belgium with cresols—has been used with partial success as secondary to the hygienic regulations as to care of excreta, water-supply, baths, change of clothing, and supervision.

¹ *Lancet*, June 14, 1902, p. 1677.

² *Sanitary Record*, Sept. 24, 1903, p. 313.

Sunstroke among Soldiers.—Hiller¹ cites the following atmospheric factors contributory to sunstroke: (1) Elevation of the temperature of the air, which he considers as a favorable condition, but not a direct cause. (2) Elevation of the degree of humidity, which hinders evaporation from the skin. (3) Absence of wind, which has a similar effect. (4) The direct rays of the sun heat the clothing and hence the body underneath the clothing. By way of prevention he advises: Avoiding marches in hot days, and the selection of the early hours of the day for marching in midsummer; adjusting the soldiers' clothing to the conditions of weather; reducing the weight which he carries to 21 kilos (46 pounds), as advised by Zuntz and Schumburg. The surgeon should also exercise great care in the selection of men intended for service in hot climates, special attention being given to the condition of the heart and lungs.

File-making as a Dangerous Occupation.²—The chief danger to the workman in this industry arises from the handling of the lead bed in which the file is cut, and from inhaling the lead-dust produced by the blows of the hammer in cutting the files and in brushing them when cut. The handling of the lead, and the consequent reception of the metal into the system from putting the fingers in the mouth or partaking of food with unwashed hands, constitutes a greater danger than the breathing of the air laden with lead-dust. The following is a brief digest of the revised regulations proposed: (1) 350 cubic feet of air-space to each person, not reckoning space above 10 feet from the floor. (2) Distance between workers to be not less than 3 feet. (3) Floors of work-rooms to be of substantial, washable material and kept in good repair. (4) Efficient ventilation to be provided and the ventilators to be kept in good repair and in working order. (5) No one must interfere with the working of the ventilators. (6) Adequate washing facilities to be provided for each worker. (7) Walls and ceilings to be either painted, varnished, or made of glazed brick, and if not of these materials, to be lime-washed every 6 months. (8) Floors and benches to be cleaned once a week. (9) If work is conducted in a dwelling-house, it is not to be carried on in a room used for sleeping or eating meals. (10) Every worker to wear a long apron reaching below the knees; the apron to be kept clean. (11) Regulations to be posted in factories and workshops. Two interesting tables are appended to the report. The first presents the mean annual mortality per 1000 of file-makers of different ages compared with 42 other occupations, from which the following figures are abstracted:

MEAN ANNUAL MORTALITY PER 1000 OF FILE-MAKERS COMPARED WITH THAT OF ALL MALES AT DIFFERENT AGES OF LIFE.

	15-20	20-25	25-35	35-45	45-55	55-65	65 and over
All males	4.1	5.6	7.7	13.0	21.4	39.0	103.6
File-makers	1.7	6.9	11.1	26.1	40.1	70.8	147.4

¹ Der Hitzschlag auf Marschen, Berlin, 1902.

² Report to his Majesty's Secretary of State, on regulations proposed for Factories and workshops in which file-cutting by hand is carried on. London, 1903.

From different diseases the figures are as follows:

COMPARATIVE MORTALITY FROM CERTAIN CAUSES AMONG ENGLISH MALES AND AMONG FILE-MAKERS.

	CAUSES OF DEATH.							
	All Causes,	Phthisis,	Diseases of the Nervous System,	Diseases of the Circulatory System,	Diseases of the Respiratory System,	Diseases of the Digestive System,	Diseases of the Urinary System,	Plumbism.
All males.....	1000	192	102	132	224	58	44	1
File-makers ...	1810	402	212	204	423	72	104	75

FOOD INSPECTION.

Hygienic Requirements in the Milk Trade.—Retch¹ outlines the requirements necessary to insure a clean, constant, and reliable milk-supply, and to provide a place where different combinations of milk may be put up according to the prescriptions of physicians, with accuracy and under such conditions of cleanliness as to insure the best possible food for infant-feeding. (1) Regular feeding throughout the year and guarding the cows from eating too fresh green food in the spring and unsuitable herbs and grasses in the pasture. The rapid growth in spring and the fresh grass following the autumn rains, greedily eaten by the cows, constitute fruitful sources of infantile digestive disturbance. (2) Dry grooming of the cows in clean sheds away from the stable. (3) An ideal cow-house. Cemented walls and floors with no connection with sewer or drain-pipes, and a cement gutter which can be thoroughly and frequently flushed out with hose. Drinking-water in each stall. Food not to be kept in same building with the cows. The cows should be kept from lying down until after they have been milked, thus avoiding dirt. Flies to be kept away from cows, especially those which breed in horse manure, and for this reason horses to be stabled at a long distance from cow-sheds. Cows kept for infant-feeding should have at least 1200 cubic feet each. (4) Careful supervision of cows' health. Those with slight indisposition or rise of temperature to be isolated until entirely well. (5) Careful tuberculin tests to be made. (6) Regular microscopic examination of the milk. (7) Medical examination of the milkers. There should be intelligent men trained for the purpose of milking for infant-feeding. Cleanliness of skin and hair, hands and arms, and clean suits to be washed daily. Sterilized milk-stools and receptacles for the milk. (8) Cows to be milked in their stalls, rather than in a special milking-room. (9) Immediately after the milking, the milk should be brought in close-covered receptacles to a room at least some hundreds of yards away from the barn and milk-house. A separate set of men should groom the cows. The milk to be brought into the milk-room through sterile receptacles, poured over sterile cooling pipes, and received into

¹ Brit. Med. Jour., Sept. 6, 1902.

sterile jars kept in ice-water. The milk-room, ceiling, walls, and floor are made of polished cement, and the air drawn into the milk-room by a fan, through a spray of clean, cold water. Glass receptacles and tubes for bottling the milk are brought in through the side of the room by means of a sterilizer. (10) The dairyman should be healthy, intelligent, and clean. His clothes, steamed and dried, should be white so that dirt may be detected. No one but the dairyman should be allowed in the milk-room. (11) In the milk-room there is a set of sterilized glass jars ready to receive cream of different percentages obtained by a separator. Other jars are for the fat-free milk, and still others for the whole milk. From the milk-room these jars are transported as quickly as possible to the milk laboratories, where the modification takes place. (12) The milk laboratories, if in the city, should have an office entirely separate from the work-rooms.

Milk and Tuberculosis.—Ostertag¹ undertook an extensive investigation of the question concerning the presence of tubercle bacilli in the milk of cows in which tuberculosis could not be recognized by clinical symptoms, although the animals reacted to the disease. These experiments involved the selection of 10 cows, all of which reacted to tuberculin, inoculation and feeding experiments with the milk of these cows, and subsequent postmortem examination of the cows. Microscopic examination and inoculation experiments with the milk in guineapigs failed to show a single instance in which tubercle bacilli were present. A number of inoculation experiments were made on guineapigs, but none of the animals developed any symptoms of the disease or showed evidence of being infected, when a microscopic examination was made postmortem. Feeding experiments with the milk of these cows were undertaken upon guineapigs, pigs, and calves. The general result of the feeding experiments substantiated that which was previously obtained by the author in similar experiments. It was shown that the milk of cows which simply reacted to tuberculin does not contain tubercle bacilli. This was proved by microscopic examination and by inoculation and feeding experiments with guineapigs. Further proof was obtained by feeding calves and pigs. In these experiments it was found that calves and pigs could be fed for weeks or even months upon the milk of such cows without becoming infected. The author recognizes that for the prevention of the further spread of tuberculosis the most important measure is the extermination of mammary tuberculosis and cases which may be recognized by external symptoms.

Food Preservation.—The Congress at Brussels,² after a lively discussion upon the subject of the use of antiseptics in food, finally adopted a resolution offered by Dr. Vaillard to the effect that the use of antiseptics should be totally prohibited. See also on the same subject (boric acid) seven articles by officials of the Imperial Board of Health of Germany.³ See also note on the bacterial contents of hashed meat preserved with soda sulfite, by Mayer.⁴

¹ Zeit. Fleisch- und Milch-Hygiene, 1 and 3, 1901, and 4, 1902.

² Sanitary Record, Sept. 17, 1903, p. 289.

³ Arbeiten aus dem kais. Gesundheitsamte, vol. 19, 1, 1902.

⁴ Hygienische Rundschau, 11, 1901.

Purification of Milk by Means of Centrifugal Separation.—Eckles and Barnes¹ report the results of experiments to determine to what extent milk may be deprived of its bacteria by centrifugal separation, the distribution of the bacteria in the cream, and the skim-milk, and the effect of the process on the keeping qualities of the milk. In 7 experiments determinations were made of the number of bacteria in the milk before separation and in the mixed skim-milk and cream after separation. There was an average reduction of about 36 %. After 24 hours milk which had been separated contained on an average 0.03 % less acid than non-separated milk. In 8 other experiments the skim-milk contained on an average 29 % of the germs present in the whole milk, the cream 24 %, and the separator slime 47 %. Centrifugal separation removes practically all the solid impurities of the milk, but improves the keeping qualities of the milk little, if any.

Prizes for Milk Hygiene.—The Hamburg Exposition of milk hygiene offers 31 prizes for the best method of cleaning bottles, for the best contribution on the subject of modifying milk for infants, for keeping and sterilizing milk, and for popularly worded pamphlets on these subjects.

For a very full and elaborate statement relative to the **modification of milk in the feeding of infants**, see "British Medical Journal."²

Consumption of Horse-meat in Italy.—Frassi³ presents interesting facts as to the consumption of horse-meat in Parma as well as in the country of Italy at large. He does not agree with the common opinion that the sale of horse-meat injures the sale of other meat on account of cheaper price, but believes that the food-supply of the working classes has improved in proportion to the introduction of horse-meat as an article of food. The number of horses slaughtered varies much at different seasons, the greatest number being killed in November and December, the difference being accounted for by the higher cost of feeding in winter and the decrease in the demand for horses. There were 15 shops in Parma in 1901 where horse-meat was sold, most of which were open only from October to April, only one or two remaining open later in the season. In this category about one-half the animals included were asses and one-tenth mules. The customers are mostly of the working classes. About 20 % of the meat is used in hotels and some goes to restaurants. A considerable quantity is employed in making sausages. The author considers the use of this meat as a matter of great hygienic importance, in consequence of the almost absolute immunity of the horse to one of the most common of all diseases in certain other food animals—tuberculosis.

Alcohol and Life Insurance.—Sir Dyce Duckworth⁴ has drawn special attention to the long-continued and mischievous effects of drinking alcohol even in slight excess, either between or with meals. He has a strong impression that more insured lives are cut short by this habit than by tuberculosis or any other disease which is already dreaded by

¹ Iowa Station Bulletin, lix, 55-59.

² Sept. 6, 1902.

³ Atti dell'Ufficio d'Igiene della Città di Parma, 1902.

⁴ Public Health, April, 1903, p. 410.

life insurance companies. Far greater benefit to the public health is likely to accrue from clear and definite teaching as to the rightful use of alcoholic drinks than is ever to be expected from efforts to abolish their employment altogether.

Oysters and Sewage.—The recent outbreaks of illness at Winchester, Portsmouth, and Southampton, England, have led the merchants engaged in the oyster trade to adopt a series of resolutions urging upon the Local Government Board the necessity of more efficient legislation to prevent the discharge of sewage into tidal waters where oysters are cultivated.¹

WATER-SUPPLIES AND DRAINAGE.

The Existence of Nitrites in Drinking-water.—Dienert² does not regard the presence of nitrites in water as necessarily a proof of serious contamination. As the results of observations and analyses of different waters he concludes: (1) That nitrites may be found in the subsoil independently of any contamination. (2) That contamination of water is not always accompanied by the formation of nitrites. (3) Certain precautions are necessary in examining for nitrites in water, since if the temperature of the air is raised during the transportation of the sample, nitrites may be found which did not exist in the water when it was collected. (4) According to the conclusions of Spiegel, any opinion as to the quality of a sample of water should be made independently of knowledge as to the existence of nitrites.

The Destruction of Pathogenic Germs in Water by the Use of Ozone.—It is stated by Schüder and Proskauer³ that their experiments have been in progress since February, 1902, at some works lent to them for the purpose by Messrs. Siemens and Halske in Martinikenfelde. These works had also been used for investigations by Messrs. Weyl, Ohlmüller, and Prall, who have published their conclusions. The first of these experimenters merely examined the number of germs present in water from the River Spree, before and after treatment with ozone, but the two last-named observers, in conjunction with similar investigations, employed also for their tests water which had been infected with the germs of cholera and typhoid fever. They came to the conclusion that the bacteria thus introduced into the water were wholly destroyed by the process of treatment. They believe, moreover, that the ozone treatment is one capable of competing with the ordinary and well-known methods of purifying water for drinking purposes. They give no indications concerning the manner in which the ozone acts upon pathogenic germs, which may happen to be present in water, and it was chiefly this fact which the tests here recorded were intended to elucidate. Certain objections are taken by the authors to the mode of carrying on the experiments by their predecessors, and the various tests here set forth were made under the precautions insisted upon by them as being essential.

¹ British Food Jour., Jan., 1903, p. 3.

² Rev. d'Hygiène, April, 1903, p. 301.

³ Zeit. f. Hyg., vol. xli, pt. 2, p. 227.

The results they thus obtained prove that the treatment was not in all cases fatal to the vibrios of cholera which had been introduced into the water. In the same way, when dealing with the bacteria of typhoid fever and coli bacilli, under the normal conditions, it was not always possible to sterilize the water. When the sterilizing sowers were filled with a fine-grained material, in lieu of the coarser material first employed, the process proved to be invariably effectual. Details are given of the volume of ozone needed, and of the cost of the treatment.

The Significance of Phosphates in Drinking-water.—Woodman¹ concludes "that the amount of phosphate and its variation seem to follow the same general line as the other mineral constituents whether either accompany the polluting material or are produced by its decay, especially the nitrates and the chlorids. It is not, however, so delicate an indicator as these. The results obtained by the calorimetric method would seem to indicate that the limit of 0.5 part of phosphorous pentoxid per million, as given by Hebnier for nonpolluted waters, is rather low. A safer amount would be one part, although the average would be lower than this."

Soil Pollution; its Relation to Endemic Conditions.—Pringle² discusses the subject of the endemicity of infectious diseases, with special reference to typhoid fever, and after citing certain factors as essential to the production of an endemic condition, he presents the following essential factors: (1) The existence of a specific pathologic microbe which may be (*a*) a parasitic organism capable of living as a saprophyte, or (*b*) a saprophytic organism capable of acting as a parasitic organism; (2) a permanent condition of the soil suitable for the existence of the organism; (3) the existence of a susceptible population. The part played by direct infection in the spread of typhoid fever is probably very small. The author attaches much importance to the old privy-vault or midden systems in the production of typhoid fever, and cites 14 English cities still having privy-vault systems, and 14 other cities having sewers and water-closets, in which the mean annual typhoid death-rates bore the relation of 25 to 19 (or as 100 to 76). In the same cities the mortality from diarrhea bore the relation of 1.20 in the former group to 0.885 in the latter, or as 100 to 71. In 5 other large cities having a mixed system of privies, pails, and sewers the rate was intermediate between the foregoing. The author quotes the experiments of Delepine and of Robinson, as well as his own observations, to show how it is that typhoid fever has a tendency to cling to localities when it has once gained a footing in them, since they had shown that, given specific inoculation combined with organic pollution of the soil, the typhoid bacillus is capable of maintaining its existence for a year or more. The viability of this bacillus in a polluted soil gives a key to the solution of the problem of the regular autumnal rise of the incidence of typhoid fever. The most favorable conditions of nutriment, temperature, and environment are normally attained in a soil just prior to the rise in the attack-rate from typhoid fever. The temperature of the soil has reached its highest point, and such organic matter as may exist in the soil is undergoing its most rapid and

¹ Jour. Am. Chem. Soc., 24, No. 8, 1902.

² Public Health, Aug., 1903, 630.

complete decomposition, and hence any saprophytic organism is placed under conditions more suitable for its multiplication and development. The author believes that infectious diarrhea is caused by a group of bacilli belonging to the colon group and that its development is due to similar causes with those which are related to typhoid fever.

Private Drains.—Decision of King's Bench Division.¹ January 30, 1903. Public Health Acts. Nuisance—drain-pipe used in common by two owners—recovery of share of cost of remedying nuisance. When two adjoining owners use a private drain in common, in which a nuisance arises, and both are served with notices requiring them to abate the nuisance and do certain works, if one, in obedience to the notice, does the whole of the work, he cannot recover a share of the expenses from the other.

The Bacteria Found in River-water.—Jordan² examined the water of 3 great rivers, the Mississippi, the Missouri and the Illinois, at different points, with the following results: (1) The kinds of bacteria that are isolated by the gelatin plate method from certain river-waters freshly polluted with sewage are different from those found in the same water collected a long distance below the point of pollution. (2) In the freshly polluted water nonchromogenic staphylococci were found much more abundantly than in the pure waters. (3) In the freshly polluted water the fluorescent bacteria, and a group of nongas-producing, nonliquefying bacteria, were less abundant than in the purer waters. (4) A larger proportion of organisms belonging to the proteus group were isolated from gelatin plates than from fermentation tubes. The reverse is true of the *Bacillus coli* and *B. lactis aerogenes* types. A certain seductive influence even upon gas-producing organisms would seem from this to be exerted by the conditions within the fermentation tube. (5) The study of a rather larger number of separately isolated cultures belonging to the fluorescent class of microorganisms shows that the differences between the "liquefying" and "nonliquefying" varieties are more constant than is sometimes assumed. The action of these forms upon milk is just as diagnostic as their action upon gelatin. All the strains of fluorescent bacteria that were encountered proved to be sterile. (6) Considering as a whole the various physiologic tests applied to the several groups of microorganisms, it is found that within almost every group which has been studied divergence is shown by closely allied organisms in respect to indol formation and reduction of nitrates. The formation of a surface pellicle on broth is also a phenomenon that presents no apparent correlation with more salient physiologic characteristics.

POISONS IN THEIR RELATION TO PUBLIC HEALTH.

On Chronic Sulfite Poisoning.—H. Kionka and L. Ebstein³ state that the poisonous nature of sulfurous acid and its salts had been pointed out some 6 years ago by one of them, and attention had been called to the

¹ Public Health, April, 1903, p. 409.

² Jour. of Hyg., Jan., 1903, p. 1.
³ Zeit. f. Hyg., vol. xli, 1902, p. 123.

dangers to health which might arise by the employment of sulfites for the preservation of meat and other kinds of food. So called "preserving salts" are sold to wholesale butchers, consisting of impure sodium sulfites mixed with varying quantities of sodium sulfate, with directions to add from 1 to 2 grams to each kilogram of meat, and stating that this amount would not be injurious. The authors, as the result of various experiments with dogs, came to the conclusion that meat thus treated gave distinct evidences of poisonous action, and the German Government, in October, 1898, issued a notice warning feeble and delicate persons against partaking of salt meats which had been cured with substances containing sulfurous acid compounds. Since then additional facts have been published, and the authors undertook a searching investigation into this subject, the results of which are herein set forth. Six dogs were selected for experiment; 3 were fed on meat treated with either 1 % or 2 % of preservative salt. The salt used was, in the case of 3 of the dogs, chemically pure sodium sulfite, and for the other dogs the salt employed was that commonly sold for trade purposes. After the end of 64 days or 67 days the dogs were bled to death. Throughout the experiments the animals fed well and remained healthy, and after slightly gaining in weight retained their increased weight to the end. The postmortem results indicated very fully the poisonous action of the diet, and the full particulars are set forth in detail. The authors state that their inquiry confirmed the conclusions which they had previously announced, and indicated that sulfites, when used in the quantities commonly found in salted meats, lead to well-marked blood-poisoning symptoms in the case of dogs fed upon such meats, and they were therefore of the opinion that it would be advisable to wholly prohibit the use of sulfites for meat-preserving purposes. This has now been done by the decree of February 18, 1902.

The Hygienic Importance of Different Metals in the Household.—Lehmann¹ discusses the different metals which are liable to prove harmful on account of their uses in connection with the preparation of food, the conveyance of water, and other household purposes, such as coloring-matters, toys, etc. Lead of all metals he regards as the most likely to prove poisonous. Copper is of less importance, since its presence in injurious doses is revealed by its color and metallic taste. He regards zinc as having no hygienic importance. Tin becomes dangerous in proportion to the amount of lead which it may contain as an impurity. The author does not consider the theory that tin vessels become dangerous by means of the action of food containing acids, as well established. No cases of injury from nickel and aluminum are recorded.

Paralysis of the Limbs in a Boy from Using a Trumpet Having a Leaden Mouthpiece.—Variot² cites the case of a boy 8 years old who had paralysis of the extremities. He dragged his legs in walking, often fell, and had difficulty in holding himself up, except when sustained by a companion. He was also clumsy in the use of his hands, and could not

¹ Deut. Vierteljahrsschrift f. öff. Gesundh., 34, 1902.

² Bull. de la Soc. méd. des Hôp., April 25, 1902, p. 368.

cut his food or turn a key in its lock. A month before his illness he was given a trumpet having a leaden mouthpiece, upon which he played several hours daily. This mouthpiece, on analysis, was found to consist of lead 88 %, tin 3 %, and antimony 9 %. Removal of the toy and electric treatment were followed by rapid recovery.

The Toxicity of Carbon Monoxid.—Mosso,¹ reports the results of experiments made in a tight chamber hermetically sealed and of 5740 liters capacity (about 200 cubic feet). A man entered the chamber and was exposed to varying quantities of carbon monoxid from 0.18 cubic foot up to 0.92 for periods of 5 minutes to an hour or more. The smaller quantities had but little effect, but quantities of 0.4 cubic foot or more produced very serious symptoms which would plainly have become fatal upon longer exposure. Grehaut, who performed similar experiments with a dog, found that less than 0.5 % of the capacity of the chamber was enough to kill a dog. More definitely, a proportion of CO equivalent to $\frac{1}{2\frac{2}{3}}$ of the air capacity of the room, or 0.43 %, is sufficient to kill either dog or man. These experiments were not made with illuminating gas, but with its most poisonous constituent, carbon monoxid.

Arsenic in Living Organisms.—Bertrand² considers the question whether arsenic is a normal constituent of living organisms existing under perfectly normal conditions. He made observations upon animals living in a normal medium and free from the conditions which exist upon land, where arsenic enters into the operations of agriculture and other industries to a large extent. For this purpose the animals, fishes, etc., which inhabit the depths of the sea presented favorable opportunities for observation. The specimens were taken during a cruise upon the yacht "Princess Alice," except a sheep from the pastures of Mt. Pico and a grampus harpooned in the Mediterranean Sea. The others were taken from the depths of the Atlantic, some at a depth of a mile or more. The fishes and other objects examined were starfish, sea-urchins, barnacles, sponges, actinia, cuttle-fish, tunny, sea-bass, tortoise, etc. The amounts of arsenic found were from 0.001 to 0.005 milligram, in quantities of material varying from 12 to 80 grams of dry matter. Specimens of sand dredged from the bottom also contained small amounts of arsenic. He concludes, therefore, that arsenic exists as a fundamental element of existing organisms, and believes it necessary in all medicolegal investigations to make careful quantitative analyses and not to be content with merely determining the presence of arsenic.

LEGISLATION.

By an Act of Congress dated July 1, 1902, provision was made for regulating the sale of virus, serum, toxins, and analogous products in the District of Columbia and for interstate traffic in the same articles. By Section 1 of the Act no persons are allowed to sell, barter, or exchange or offer for sale, barter, or exchange, the foregoing articles unless licensed by the Secretary of the Treasury and unless each package is plainly

¹ Jour. of Gas-lighting, Nov. 18, 1902.

² Ann. de l'Inst. Pasteur, Jan., 1903.

marked with the name of the product, the name, address, and license number of the manufacturer, and the date beyond which the contents of the package cannot be expected to yield their specific results. Section 2 forbids false labeling or the altering of labels so as to falsify them. Section 3 provides for inspection by government officials. Section 4 creates a board of supervision with authority to make rules and regulations to govern the issue, suspension, and revocation of licenses. Section 5 authorizes the Secretary of the Treasury to enforce the provisions of the Act. Section 6 forbids interference with officials performing duties under this Act. Section 7 provides a penalty of \$500 or imprisonment for violation of the law. The Treasury Department has issued regulations concerning the issue and revocation of licenses and for the inspection of establishments and examination of their products, dated February 21, 1903.

Important legislation relative to public health has been enacted in the following States¹: In Iowa by chap. 107, 17 March, the State Board of Health may call on police officers if local boards refuse to obey. In Maryland by chap. 475, April, 1902, county health officers may be appointed for 2 years. In Massachusetts the State Board is authorized by chap. 230, 1902, to publish certain health information, and to print a manual of health laws triennially. In Iowa local boards of health must meet twice a year, in April and November (chap. 106, 1902). In Louisiana, by chap. 194, 1902, provision is made for examination and license of plumbers; also in Virginia similar action by chap. 348, 1902. In Massachusetts the State Board of Health is to publish monthly lists of adulterated foods and names of manufacturers (chap. 272, 1902). In New Jersey the State Board of Health, by chap. 183, 1902, may fix the limits of variability of food and drugs whose standing is not fixed by law. In Montana, by chap. 540, baking-powders must be labeled with a statement of their ingredients. In New Jersey, by chap. 16, 1902, the keeper of State prison is forbidden to admit prisoners when an inmate has a contagious disease. In New Jersey, by chap. 98, 1902, the State Experiment Station is to investigate the mosquito problem and \$10,000 is appropriated for the purpose. In Iowa, by chap. 108, the State Board of Health is to settle controversies relative to location of pesthouses. In Maryland a commission may be appointed to investigate tuberculosis and methods of preventing it; \$4000 appropriated (chap. 451, 1902). Similar commission in Ohio; \$500 appropriated. In New Jersey, by chap. 126, State sanatorium established. In Ohio, by chap. 131, 14 April, cemeteries cannot be located within 200 yards of dwelling house without owner's consent. In Maryland and Virginia laws have been executed forbidding spitting in electric and other cars and on railway platforms. Similar ordinances now exist in nearly all large cities. In Rhode Island emission of dense smoke is forbidden in cities of more than 150,000 (chap. 983, 1902).

English Sanitary Legislation of 1902.—The year 1902 was not very fruitful in sanitary legislation in England, the only sanitary acts of

¹ Dewey's Digest of Legislation of 1902. Albany, N. Y.

importance being the Cremation Act (chap. 8, 2 Edward, 1902) and the Registry of Midwives Act (chap. 17). By the provisions of the former, which is entitled an Act to regulate the burning of human remains and the establishment of crematories, the plans and sites of crematories must be approved by the Local Government Board. They must not be built within 200 yards of a dwelling, without the consent of the owner of the latter, and must not be built within 50 yards of a public highway. The Secretary of State is authorized to make regulations and enforce with penalties. The Midwives Act is entitled an Act to secure the better training of midwives, and to regulate their practice. By its provisions midwives must be certified. A board of 7 persons, 4 of whom must be physicians, are authorized to make regulations, examine candidates, and issue certificates.

VITAL STATISTICS.

Malaria in Italy.¹—In Italy malaria plays a conspicuous part, both in tables of mortality and in those of morbidity. The deaths in Italy from malarial fevers in 1899 were 10,811 in a total mortality from all causes of about 700,000.² There had been, however, a gradual diminution in the deaths from this cause year by year since 1887, when they numbered 21,033, or about 2.5 % of the deaths in that year. The real significance of this disease as a prevalent pest is best shown by the monthly government reports of Italy, which give information as to the prevalence of infectious diseases. In the following statistics the figures are given for the months of September and October, 1902, with the names of the notifiable diseases, by which it appears that the cases of malarial fever constituted 64 % of all the cases reported in these 2 months: Estimated population, 32,475,253; reported cases of measles, 10,295; scarlet fever, 1811; smallpox, 1870; typhoid fever, 13,444; typhus fever, 94; diphtheria, 2472; puerperal fever, 529; tuberculosis, 1281; **malarial fever, 58,787;** syphilis in infants, 103; rabies, 31; malignant pustule, 1322; glanders, 14. Total, 92,053. The southern provinces suffered most from malaria, the deaths amounting in Sardinia to 276 per thousand inhabitants, in Basilicata to 111, in Sicily to 78, and Rome 44, while in the northern provinces the deaths from this cause were comparatively few. The greatest number of deaths from this cause occurred between 1 and 5 years, and the deaths of females were as 1000 to each 1238 males. By occupations the highest mortality occurred among shepherds and herdsmen, next among farmers, miners, and ordinary laborers. These statistics are of more than ordinary sanitary interest on account of the large number of Italian immigrants constantly coming to the United States.

Cancer in Italy.—Prinzing,³ on reviewing the cancer mortality of Italy, finds it less there than in other countries, the mean annual mor-

¹ Bollettino Sanitario, Gaz. Ufficiale del Regno d'Italia, Rome, 1903.

² Statistica delle cause di morte, nell' anno 1899, Rome, 1901.

³ Centralbl. f. alg. Gesundheitspflege, 1902, p. 142.

tality for the 13 years 1887-1899 being 4.6 per 10,000 of the population, as compared with 9 in Germany, 10 in Austria, 12.7 in Switzerland, 9 in Holland, 9.8 in France, and 7.6 in England. He thinks the greater cancer mortality of the cities may be due to the coming of many cases from the country to the city hospitals, and to a more exact diagnosis of causes of death in the cities. He agrees with other writers in disregarding the great prevalence of malaria as having any influence in diminishing the cancer mortality. See also paper by Kolb,¹ of Munich, upon cancer in southern Germany and neighboring countries.

Fecundity of French Canadians.—The Board of Health of Quebec² has published the results of an inquiry relative to the number of children born in each of 1000 French Canadian families, 500 in rural and 500 in urban districts. The figures show an average of 9.33 children per family in the rural districts and 9.06 in urban districts. Sterile marriages appear to be excluded in these observations, since the figures are from the records of a society of artisans from which persons having no children are excluded. This circumstance, however, appears to be counterbalanced by the fact that after joining the society the families of many of the applicants continue to increase, in the number of their children. In some of the eastern counties of Quebec the birth-rate has occasionally reached the figure of 55 to 60 per thousand inhabitants.

Vital Statistics of England for 1902.—The following figures are taken from the advance sheet published by the Registrar General's office for the year 1902, and, as he states, "will probably be found to differ but slightly from the revised figures published" at a later date in his Annual Report to Parliament: Estimated population of England and Wales, 1902, 32,997,626; marriages, 261,386; persons married, 522,772; births, 942,822; deaths, 537,080; marriage-rate, 7.92 per 1000; marriage-rate, persons married, 15.84 per 1000; birth-rate, 28.57 per 1000; death-rate, 16.28 per 1000; sex of births, 480,619 males, 462,203 females, or 1000 females to 1040 males (the same as in the previous year). London: Population estimated for 1902, 4,579,110; marriage-rate, 8.91 per 1000 (persons married, 17.83 per 1000); birth-rate, 29.01 per 1000; death-rate, 17.31 per 1000.

QUARTERLY PERCENTAGES OF BIRTHS, MARRIAGES, AND DEATHS IN ENGLAND AND WALES, 1902.

	BIRTHS.	MARRIAGES.	DEATHS.
First Quarter.....	24.65	20.62	28.17
Second Quarter.....	25.12	23.86	24.62
Third Quarter.....	25.57	27.34	21.46
Fourth Quarter.....	24.66	28.18	25.75
	100.00	100.00	100.00

¹ Zeit. f. Hyg. u. Infektionskrankheit., 1902, 40, 3, p. 373.

² Bulletin Sanitaire, Montreal, Sept., 1903.

GENERAL DEATH-RATES PER 1000 LIVING IN DIFFERENT COUNTRIES.

Twenty-five years' average (1876-1900) and in 1901.

	England and Wales.	Scotland.	Ireland.	Denmark.	Norway.	Sweden.	Austria.	Hungary.	Switzerland.	Germany.	Holland.	Belgium.	France.	Spain.	Italy.
Average in 25 years (1876-1900)	19.1	19.2	18.2	18.3	16.6	17.0	28.6	32.3	20.6	24.2	20.3	20.1	21.9	30.3	26.5
1901	16.9	17.9	17.8	15.8	14.9	16.0	24.2	25.4	18.0	20.7	17.2	17.1	20.1	27.6	22.0

The highest death-rate in any year was 37.4 per 1000 in Hungary in 1878, and the lowest was 14.9 in Norway in 1901.

DEATH-RATES PER MILLION LIVING FROM DIFFERENT INFECTIOUS DISEASES AND FROM CANCER.

In England and London in 1901, and in Germany and in Berlin, Paris, Hamburg, and Munich in 1900.

DISEASES.	1901. England.	1901. London.	1900. Germany.	1900. Berlin.	1900. Paris.	1900. Hamburg.	1900. Munich.
Smallpox	10	5	9	0	105	0	0
Measles	276	434	228	279	351	142	838
Scarlet Fever . . .	133	113	242	325	76	129	10
Whooping-cough . .	313	355	342	197	81	146	102
Diphtheria	273	285	381	284	134	163	224
Cerebrospinal Meningitis	2	4	5	3	—	—	—
Typhoid Fever . . .	155	116	111	66	391	33	54
Diarrhoeal Diseases .	924	862	3381	3268	1137	2475	6189
Puerperal Fever . .	64	48	51	58	—	7.5	40
Pneumonia	1147	1333	1384	1413	1790	1206	262
Phthisis Pul. . . .	1264	1642	2023	2373	4154	2620	3170
Cancer	842	939	710	1092	1151	1190	1190

The figures for cerebrospinal meningitis are not given in the returns of Paris, Munich, and Hamburg, and those of puerperal fever are not given in the Paris returns, hence the absence of figures for these diseases in the foregoing table does not imply the absence of the diseases in the places named.

Death Certification.—The *Lancet*,¹ in commenting upon the desire of a mother to obtain a certificate of death before the child had actually died, says: "When a motive exists for obtaining a death certificate wrongfully it is usually to be found in the fact that the deceased has been insured." In the United States an additional motive may occasionally be found in the desire to complete certain evidence offered in support of a pension claim.

MISCELLANY.

The Carbonic Acid Test as an Index of Atmospheric Impurity.—Sanarelli and Biffi² conclude from experiments that the standard of Pettenkofer does not rest on exact knowledge, and that the estimation of carbonic acid is an insufficient index of the amount of other impurity,

¹ London *Lancet*, Sept. 19, p. 837.

² *Annali d'Igiene Sperimentale*, 12, 1902.

as the ratio of evolution from the human being varies, but not in regular ratio.

The Suppression of Dust by the Use of Petroleum and Tar upon the Streets.—Guglielminetto,¹ in a well illustrated paper, urges first the sanitary importance of getting rid of the dust, and states the advantages of treating with petroleum or tar, first over paving, which is far more expensive, notwithstanding the comparatively high cost of the former in France, but also over sprinkling, either with fresh or salt water, which quickly evaporates. Sprinkling cannot be satisfactorily conducted in crowded streets. The author details the conditions of weather, soil, etc., under which the best results are obtained, as well as the apparatus with which tar may be applied to the surface of roads.

Sweeping or Dusting by Aspiration.—Recognizing the hygienic significance of dust and the warfare against it by the substitution of cleaning with moistened sawdust, by smoke prevention, the prevention of spitting upon floors and sidewalks, the use of tar and asphalt upon streets and railways, Hannot² describes a new apparatus for the purpose of sweeping and dusting carpets, upholstery, railway cars, and the grooming of dusty animals for the removal of dust and parasites. The apparatus consists of a bronze aspirating pump worked by electricity, and making about 250 revolutions per minute. The aspiration is effected by flexible rubber tubes, connected with a flattened metallic cone; the dust is collected in a closed chest or box, from which it is deposited through a valve into a pail at intervals. The inventor experimented upon the seats in several theaters, and from the cushioned seats in one of them he removed 210 kilos (420 pounds) of dust, the accumulation of several years.

¹ Rev. d'Hygiène, April, 1903, p. 347.

² Rev. d'Hygiène, Feb., 1903, p. 118.

PHYSIOLOGIC CHEMISTRY.

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INTRODUCTION.

ONE will scarcely fail to note the advance during the year in our knowledge of the structural chemistry of the crystalline proteid hydrolytic products. Fischer definitely proves that lysin is $\alpha\text{-}\epsilon$ -diamido-caproic acid, and determines the positions of the substituting groups in serin, while Fränkel finds an answer to the long-standing riddle, the constitution of histidin. This substance has been classed as a diamido-acid, and was thought, apparently without sufficient evidence, to be closely related to lysin and argenin. Fränkel finds that it is in reality a derivative of pyrimidin, and as the compound is found as a hydrolytic product of all proteids, a great deal that has been written on the relation of uric acid and urea to the pyrimidin ring, and therefore to the nucleic acids, might now with equal propriety be said of the relation of these compounds to the proteids themselves. Kossel also finds that cytosin is a pyrimidin derivative, which, when we consider its origin, is not surprising.

Special attention should be called to Cohnheim's remarkable discovery of the joint action of pancreatic and muscle extracts in glycolysis. Neither of these fluids can separately cause sugar to burn; both together can. The work shows the necessity for further research along similar lines, and we shall be greatly surprised if the near future does not disclose some interesting chemical reactions that can be accomplished by the simultaneous presence of two or more body-fluids.

Perhaps the most important publication in physiologic chemistry during the past year is the "Biochemisches Centralblatt," the first number of which appeared in December, 1902. This journal, which appears twice a month, is under the editorship of Oppenheimer, of Berlin, and a number of distinguished chemists. The scope is very wide. One of the best features is the appearance, in almost every number, of a brief summary of the present state of knowledge concerning some important subject. As examples of such summaries, the following may be mentioned: "Recent Work on the Proteids and their Cleavage Products," by Emmerling; "Fibrin Ferment," by Fuld; "The Thyroid Gland and its Active Principle," by Oswald; "The Cytotoxins of the Blood-serum," by Hans Sachs, etc.

Especially numerous during the past year have been the communi-

cations on the relation of physical chemistry to biology (and notably in its applications to the study of the urine and of the enzymes), on enzyme action, and on subjects suggested by the study of immunity (anti-ferments, etc.).

Among the books which have appeared may be mentioned "The Chemical Changes and Products Resulting from Fermentation," by Plimner; "Vergleichende chemische Physiologie der niederen Tiere," by v. Fürth. New editions of the valuable works "Chemische Analyse," by Hoppe-Seyler and Thierfelder, and "Die Fermente," by Oppenheimer, have appeared.

Höber¹ discusses the **acidity of the urine** from the standpoint of the ionic theory. He distinguishes between "ionic acidity" and "titration acidity," and discusses the methods of determining each. There is, as a rule, but little parallelism between the two kinds of acidity.

Folin² points out some of the errors of the ordinary titration methods for the determination of the total acidity of the urine. He recommends treating the urine first with potassium oxalate and then titrating with N_{10} NaOH with phenolphthalein. The author believes that an important part of the acidity is due to organic acids.

Rössler³ describes a modification of his method for the volumetric determination of **albumin** in the urine. The following reagent of Jolles is employed:

Succinic acid	2.0
Mercuric chlorid	1.0
Sodium chlorid	0.1
Distilled water	50.0

To 5 cc. of this solution are added 3 drops of dilute acetic acid. The urine to be examined is carefully "layered" on the above and the height of the white zone measured by a pair of compasses and recorded on paper.

There can be no question that Emil Fischer⁴ has as complete a mastery of the group of **amidoacids**, and especially those which result from hydrolysis of proteids, as he has of the sugar group. One can scarcely read a volume of some of the important chemical journals without finding that Fischer has made a synthesis of one of those acids or discovered a new one. One of his latest contributions has to do with serin, which was discovered in 1865 by Cramer among the split products of silk gelatin, and which has been found several times by Fischer among the hydrolytic products of proteids. In spite of the fact that this compound is the simplest of all the oxyamidoacids of the aliphatic row, and that it possesses peculiar interest for the physiologist, its structure has never been completely determined. By the action of ammonia and hydrocyanic acid on glycolic aldehyd, Fischer and Leuchs obtained a compound which could not be distinguished from the serin of silk gelatin, and which on reduction produced ordinary alanin (α -amido-propionic acid). The

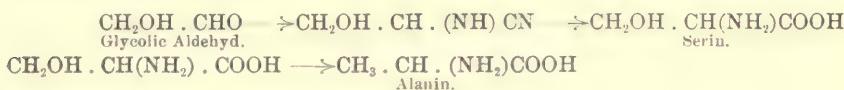
¹ Hofmeister's Beitr., 3, 525.

² Deut. med. Woch., 29, 335.

³ Am. Jour. Physiol., 9, 265.

⁴ Ber. d. d. chem. Ges., 35, 3787.

latter reaction of course shows that in serin the amido group is in the α -position; and that the compound can be no other than α -amido- β -hydroxypropionic acid. Thus:



By the application of this method to L-arabinose, Fischer and Leuchs obtained an amidoacid, $\text{CH}_2\text{OH} \cdot \text{CH}(\text{OH}) \cdot \text{CH} \cdot (\text{OH}) \cdot \text{CH}(\text{OH}) \cdot \text{CH}(\text{NH}_2) \cdot \text{CO}_2\text{H}$, which was found to be the optical antipode of the so-called chitaminic acid obtained by oxidizing glucosamin. The synthesis shows that glucosamin up to the carbon atom which is adjacent to the carboxyl group, has the same configuration as D-glucose and D-mannose. The matter is most intensely interesting. There are four physiologically important derivatives of normal hexyl alcohol: viz., D-glucose (ordinary dextrose), D-fructose (ordinary levulose), glucosamin (which results from the hydrolysis of a proteid of the cartilage and from the mucins), and finally glycyrionic acid (commonly known as glycuronic acid, occurring as paired compounds after the use of chloral hydrate and also associated with the glucosamin in the mucins). While there is an extremely large number of possible stereoisomeric varieties, all four of these substances have identically the same configuration.

Although many years have passed since Drechsel's discovery of lysin, and although the substance has commanded the closest attention since Kossel showed that it is formed from the protamins and all proteids, no one has been able up to the present time to say positively what positions the amido groups occupy. Fischer and Weigert¹ have lately made a synthesis of inactive α - ϵ -diamido caproic acid which in its salts, its benzoyl and phenyleyanate compounds, bears the greatest similarity to lysin. The synthetic product is distinguishable from lysin only by its optical inactivity and slight differences in the melting-points of some derivatives. It is therefore highly probable that the synthetic product is inactive lysin and that the natural lysin is optically active α - ϵ -diamido caproic acid. The relation between the two substances is made very clear by Fischer's conversion of lysin into its racemic form, which was found identical with the synthetic preparation in all respects. Of the three substances therefore which result from the decomposition of the basic group of the proteid molecule, two (argenin and lysin) are as well understood structurally as any substance known to organic chemistry; the structure of the third (histidin) is yet to be determined. (See below, under pyramidin bodies.)

A conception of the **constitution of proteids** can be gained in the present state of our knowledge only by a study of their decomposition-products. The problem of finding all of the hydrolytic products and of making a quantitative estimation of them has many times been attempted, but the investigator is always forced to assign a term more or less indefinite to a relatively large amount of the material with which he is

¹ Ber. d. d. chem. Ges., 35, 3772.

dealing, and in the end can account for only a small part of the proteid in terms that are intelligible to a chemist. The difficulties in the way of the solution of this extremely complex but important problem have been greatly diminished by Kossel's¹ discovery of the hexone bases and the elaboration of a method for their isolation; and to a much greater extent by Fischer's² splendid work on the isolation of amidoacids, which has not only served for the recovery of substances of this class already known, but has led directly to the discovery of several new ones.

Abderhalden³ applies these methods in a masterly way to an investigation of the hydrolytic products of 3 proteids: viz., crystallized oxyhemoglobin from horse blood, crystallized serum-albumin from horse-serum, and crystallized edestin from hempseed. In the case of oxyhemoglobin he accounts for about 70 % of the proteid in terms of definite chemical individuals, in spite of the fact that losses in manipulation were unavoidable. A summary of the work is given in the table on page 605, in which the numbers express percentages. A glance at the table shows that the three proteids are very similar in their constitution from a qualitative point of view, and that even quantitatively there is considerable agreement, the greatest difference being found in the relative amounts of hexone bases. Leucin represents by far the greatest amount of material, and the preponderance of phenylalanin (representing the phenyl group) over tyrosin (representing the phenol group) is of interest. The work also shows the wide distribution of several decomposition products which Fischer has lately discovered, and is a verification of Hopkins and Cole's⁴ splendid work on tryptophan.

Fischer⁵ describes a **new oxyamido acid** which he has obtained by the **hydrolysis of gelatin**. The substance crystallizes out of water in orthorhombic forms sufficiently large for measurement, is levorotatory to polarized light, possesses a sweet taste, and has a composition represented by the formula $C_5H_9O_3N$. Like other amidoacids, it forms a crystalline derivative with phenylisocyanate. From the composition of the new acid, and from the fact that it yields α -pyrrolidin carbonic acid on reduction, Fischer believes that it is probably one of the oxypyrrolidin carbonic acids.

The **hydrolysis of horn** has hitherto given tyrosin, leucin, aspartic acid, glutamic acid, argenin, lysin, and cystin. By the application of his new method Fischer⁶ adds glycocoll, alanin, phenylalanin, α -amido-valeric acid, α -pyrrolidin carbonic acid, and serin. The finding of serin in this connection is of peculiar interest. The substance has hitherto been obtained only from the fibroin and gelatin of silk. As these proteids differ in composition very widely from horn substance, it is probable that serin has a very much wider distribution than was formerly supposed, and the fact that it has seldom been found is in great measure due to the difficulty of recognizing it.

Oxyhemoglobin, on account of the ease with which it crystallizes,

¹ Zeit. f. physiol. Chem., 31, 165.

² Zeit. f. physiol. Chem., 33, 151.

³ Zeit. f. physiol. Chem., 37, 484.

⁴ Jour. of Physiol., 27, 418.

⁵ Ber. d. d. chem. Ges., 35, 2660.

⁶ Zeit. f. physiol. Chem., 36, 463.

		GLOBIN.	SERUM- ALBUMIN.	EDESTIN.
Glycocol, NH ₂	CH ₂ .CO ₂ H			3.8
(Amidoacetic acid.)				
Alanin, NH ₂	CH ₃ .CH.CO ₂ H		4.19	2.68
(α -Amidopropionic acid.)				3.6
Leucin, CH ₃ NH ₂	CH.CH ₂ .CH.CO ₂ H		29.04	20.00
(α -Amidoisobutylic acid.)				20.90
α -Pyrrolidin carbonic acid, CH ₂ CH ₂	CH ₂ NH		2.34	1.04
	CH ₂ .CO ₂ H			1.7
Phenylalanin, C ₆ H ₅ NH ₂	CH ₂ .CH.CO ₂ H		4.24	3.08
				2.4
Glutamic acid, CH ₂ CH(NH ₂).CO ₂ H	CH ₂ .CO ₂ H		1.73	1.52
(α -Amidoglutamic acid.)				6.3
Aspartic acid, CH.NH ₂ .CO ₂ H	CH ₂ .CO ₂ H		4.43	3.12
(Amidosuccinic acid.)				4.5
Cystin, S—CH ₂ .CH(NH ₂).CO ₂ H	S—CH ₂ .CH(NH ₂).CO ₂ H		0.31	2.3
				0.25
Serin, OH NH ₂	CH ₂ —CH.CO ₂ H		0.56	0.6
(α -Amido- β -hydroxypropionic acid.)				0.33
Oxy- α -pyrrolidin carbonic acid	(Position of hydroxyl group not determined.)		1.04	2.0
Tyrosin, C ₆ H ₄ OH	CH ₂ .CH(NH ₂).CO ₂ H		1.33	2.1
(Paroxyphenyl- α -amidopropionic acid.)				2.13
Lysin, NH ₂	CH ₂ .CH ₂ .CH ₂ .CH.CO ₂ H		4.28	1.0
(α - ϵ -Diamido-caproic acid.)				
Histidin			10.96	1.1
	CH ₂ .CH ₂ .CH ₂ .CH.CO ₂ H			
Argenin, NH NH ₂	NH NH ₂		5.42	11.7
(α -Amido- δ -guanidinvaleric acid.)				
Tryptophan,	CH ₃			
	CH(NH ₂).CO ₂ H			
		Present.	Present.	Present.
(Probably skatolamidoacetic acid.)				

can probably be obtained in purer form than any other proteid, and therefore serves as excellent material for investigation of **proteid decomposition products**. The work of Pröscher¹ has definitely proved among the hydrolytic products of this proteid tyrosin, leucin, and aspartic acid, while less certainly were shown phenylalanin and glutamic acid. By fractional distillation of their ethers under diminished pressure Fischer and Abderhalden² were able to obtain in a pure condition alanin, leucin, aspartic acid, glutamic acid, phenylalanin, and α -pyrrolidin carbonic acid, and the absence of glycocoll was definitely proved. If to these 6 amidoacids be added Pröscher's tyrosin, we have certainly 7 mon-amidoacids in the molecule of globin. When we take into consideration also the diamidoacids which Pröscher proved, we find that this beautifully crystalline substance, which can be indefinitely purified, by recrystallization, has just as complex a structure as we have hitherto assigned to the amorphous proteids.

Among the hydrolytic products of proteids Fischer has always found alanin, phenylalanin, and pyrrolidin carbonic acid; in fact, one finds them more frequently than glycocoll or tyrosin. Their constancy in the structure of proteids is alone exceeded by leucin, which appears just as regularly and in greater amount.

Hopkins and Cole³ make another contribution to the **chemistry of tryptophan**—that product of the pancreatic digestion and of other deep-seated cleavage of proteids which gives a rose-red color with bromin and chlorin water and which is shown to be skatolamidoacetic acid, $C_6H_4 < \overset{C(CH_3)}{NH} > C. CH(NH_2). COOH$. Peptic digestion can also lead to the appearance of tryptophan. Skatolacetic acid results from the action of anaerobic bacteria; skatolcarbonic acid, skatol, and indol from that of aerobic organisms.

Ellinger and Gentzen⁴ found that tryptophan administered to dogs and rabbits per os or subcutaneously does not lead to an excretion of indican in the urine, but that it does lead to such an excretion when injected into the cecum; thus **tryptophan may be a precursor of the indican** which results from bacterial decomposition, but not of a (possible) formation by ordinary metabolic processes.

No distinct connection was found by Glaessner⁵ between the presence of tryptophan in the contents of the stomach and the condition, whether healthy or diseased, of the stomach. If, however, carcinomatous tissue was added to normal gastric juice, the tryptophan reaction appeared in a short time. (This experiment was suggested by the observation of Emerson that carcinomatous tissue added to normal gastric juice increased the extent of the cleavage of the proteid.) Erdmann and Winternitz⁶ also make a contribution to this subject; they did not obtain the tryptophan (or "proteinochrom," as they term it) reaction under normal conditions or in cases of nonmalignant disease, but did obtain it in the larger number of cases of carcinoma of the stomach. These authors

¹ Zeit. f. physiol. Chem., 27, 114.

² Zeit. f. physiol. Chem., 36, 268.

³ Jour. Physiol., 29, 451.

⁴ Hofmeister's Beitr., 4, 171.

⁵ Berl. klin. Woch., 40, 599.

⁶ Münch. med. Woch., 50, 982.

also studied the formation of tryptophan in bacterial cultures. Most bacteria cause its appearance, but at varying periods and independently of the formation of indol. Especially interesting is the observation that *Bacterium coli commune* forms no tryptophan, whereas in the cultures of the typhoid bacillus it was present from the second day.

Folin¹ criticizes the various methods for the **estimation of ammonia in organic fluid** which are based on the use of magnesium oxid and calcium hydrate, and objects to the widely used Schlüsing method as not only an operation involving much time but inaccurate as well. Folin claims that the following rapid method will yield exact results if employed *exactly* as described: 25 cc. of urine are treated with 8 to 10 grams of sodium chlorid and the surface of the liquid covered with 5 to 10 cc. of toluene or petroleum; finally one gram of dry sodium carbonate is added and a rapid current of air (600 to 700 liters per hour) is passed through the urine for 1 to 1½ hours and afterward through a standard solution of acid for absorption of the ammonia. The excess of acid is titrated, using alizarin-red as an indication. Folin claims that the method is applicable to the estimation of ammonium salts in other organic fluids, since under the conditions described no ammonia is split off from unstable nitrogenous organic compounds. In estimating ammonia in blood, the temperature must be kept low, the air must be conducted for a longer time, and methyl alcohol must be used instead of toluene to prevent foaming.

Joachim² reports the **analyses of the proteids** in a number of body-fluids, adopting the classification into pseudoglobulin, euglobulin, etc. In pleural fluid the amount of all three proteid fractions (the two globulins and albumin) is very constant; the amount of euglobulin is increased in pleuritis. In cirrhosis of the liver the peritoneal fluid shows a high percentage of globulin (especially of pseudoglobulin); in carcinoma of the abdominal organs there is a low percentage (especially of euglobulin). In tuberculous ascites there are great variations. In nephritic urine the amount of albumin is greater than that of globulin, and euglobulin is absent or is present only in traces. In amyloid degeneration the amount of euglobulin is much increased.

The objections of Hödelmoser, Cerny, and Ziemska are severely criticized by Gautier,³ who reiterates his former contention that **arsenic is not only found normally in the body, but is localized in certain tissues.** He claims that the reason for Hödelmoser's failure to find these traces of arsenic is apparent from the fact that Hödelmoser recovered only 0.2 mg. of arsenic from tissues into which he had introduced 1 mg. of arsenic trioxid. Gautier takes the ground that the differences between his results and those of his critics cannot be ascribed to geologic differences, since in such an event he would not have found the arsenic present in certain tissues (skin, hair, horn, thyroid, thymus, and bones) and failed to find it in others (liver, spleen, muscles, stomach, lungs, salivary glands, kidneys, suprarenal glands, urine, blood, intestine, and testicles).

¹ Zeit. f. physiol. Chem., 37, 161.

² Pflüger's Arch., 93, 558.

³ Zeit. f. physiol. Chem., 36, 391.

Bertrand¹ has not only verified Gautier's results, but has so perfected his method that $\frac{1}{2000}$ milligram of arsenic can be recovered, and finds arsenic in the thyroid of the seal under conditions which would exclude the hypothesis of an infection from the environment. Gautier believes that losses of traces of arsenic are usually attributable to oxidation in the Marsh apparatus, and describes in detail an apparatus with which such danger may be avoided.

Bertrand² states that arsenic is present in the hen's egg to the extent of $\frac{1}{200}$ mg. to the egg; most of this is in the yolk. It is believed that **arsenic is a physiologic constituent of the living organism** in the same sense that carbon, for example, is. In an earlier series of experiments³ the author has found arsenic in a considerable number of animals, ranging from sponges to sheep.

Makayama⁴ proposes the following modification of Huppert's **test for bile-pigments**. The reagents required are: (1) A mixture of 99 parts of 95 % alcohol and 1 part of fuming hydrochloric acid containing 4 grams of ferric chlorid to the liter; (2) a 10 % solution of barium chlorid. To 5 cc. of urine add 5 cc. of barium chlorid and centrifuge for a short time with a small hand-machine. Pour off the liquid, stir up the precipitate with 2 cc. of the alcoholic ferric chlorid solution, and heat to boiling. The fluid takes on a green or a bluish color, which on treatment with yellow nitric acid passes through violet into red. The test will show the presence of one part of bilirubin in 1,200,000 parts of urine.

The "protagon" of the **brain** is, according to Lesem and Gies,⁵ a mixture of various substances and not a chemical individual, and the bulk of the phosphorized organic substance of the brain is not contained in this mixture.

Grimbert and Couland⁶ find the reducing substance of the cerebro-spinal fluid to be **dextrose**. The dextrose was identified by its osazone in 19 of the 22 cases studied. Some had supposed this substance to be **pyrocatechin**.

Gulewitsch⁷ reports an analysis of cerebrospinal fluid; the results tend to confirm Halliburton and Mott's view that cholin is normally absent from this fluid.

Etard and Villa⁸ isolated **cadaverin** from the products of the hydrolytic decomposition of muscle with 15 % sulfuric acid.

T. B. Osborne and Harris⁹ conclude from experiments with various animal and plant proteids that the evidence for a **carbohydrate group in a proteid molecule** based on Molisch's furfural reaction cannot be accepted as conclusive.

Langstein¹⁰ finds that hydrobromic acid splits off certain carbohydrates from the globulins of blood-serum. One of these yields a crystalline benzoyl compound and contains N, but is not chitosamin; another

¹ Compt. rend., 132, 1235.

² Compt. rend., 136, 1083.

³ Ann. Inst. Pasteur, 17, 1.

⁴ Zeit. f. physiol. Chem., 36, 398.

⁵ Am. Jour. Physiol., 8, 183.

⁶ Compt. rend., 136, 391.

⁷ Physiol. Russe, 2, 35.

⁸ Compt. rend., 136, 1285.

⁹ Jour. Am. Chem. Soc., 25, 474.

¹⁰ Münch. med. Woch., 49, 1876.

is levorotatory, nonfermentable, and yields a crystalline osazone; the third and most important is dextrose.

Wolff¹ reports a careful study on the relation of the **cholera immune bodies** to the proteids of the serum. Of the many interesting points in the paper, only the general conclusion can be given here. The author finds that the immune bodies are not connected with the proteids, nor with any special fraction of them; Pick supposed them to be bound to the euglobulins, but the author believes Pick's methods to be untrustworthy.

Rodhain² considers that the active substances of antistreptococcus serum are quantitatively bound to the euglobulin (Wolff's criticism of Pick's work would probably apply to this work also).

Fischer³ describes the occurrence of marked lipemia and cholesterolemia in a case of **diabetes mellitus**; the blood contained 18.129 % of fat (normal 0.1 to 0.5) and 0.478 % of cholesterol (almost ten times the normal). The blood had lost all lipolytic action. Stadelmann⁴ also reports a case of diabetes mellitus in which there was 15 % of fat in the blood.

P. G. Stiles and Lusk⁵ determined the effect of feeding the end-products of a **pancreatic digestion upon sugar formation**. The products of a 14 months pancreatic digestion were given to a dog which had received, 3 or 4 days previously, phloridzin and whose sugar excretion was constant. Five gm. of nitrogen contained in the above mixture led to the appearance of 12 gm. of dextrose in the urine (D : N : : 2.4 : 1). A corresponding amount of fresh meat would have yielded 18 or 19 gm. of sugar.

Heinrich⁶ makes a brief communication on the **digestion of meat**. He found that in healthy persons one-third of the protein of boiled finely divided beef was in solution in the stomach within an hour; the solution occurred without the appearance of free HCl. Addition of carbohydrates (rice) increased proteolysis by 10 %.

Georgievics⁷ makes a brief contribution to the **theory of dyeing** in which he seeks to disprove recent experiments of Ruecht, A. Binz, and Schröter. The experiments of Ruecht have especially interested physiologic chemists and histologists, as this author seeks to explain the dyeing of wool and silk through the formation of insoluble salt-like compounds of the dye and certain constituents of the fiber (the keratin of wool, for example). Georgievics gives reasons for doubting the correctness of some of Ruecht's experiments on this subject.

Enzymes.—Following his splendid work on crepsin, the intestinal enzyme capable of splitting proteoses or peptones into simple crystalline products, but without action on any native protein except casein, Cohnheim⁸ now announces the **discovery of a glycolytic enzyme** which (as the term enzyme is sometimes loosely employed) exists partly in the

¹ Centr. f. Bakt., 33, 703.

² Virchow's Arch., 172, pp. 30 and 208.

³ Am. Jour. Physiol., 9, 380.

⁴ Z. f. Farb.-u. Text.-chem., 11, 215.

⁵ Hofmeister's Beitr., 3, 451.

⁶ Deut. med. Woch., 28 iii, 349.

⁷ Münch. med. Woch., 49, 2003.

⁸ Zeit. f. physiol. Chem., 39, 337.

muscles, partly in the pancreas, and entirely in neither. The finely divided muscle with or without the addition of pancreas was pressed in a machine. The resulting fluid was treated with a weighed quantity of glucose, and in some instances the dextrose determined directly, while in others the dextrose was determined after the materials had digested in the thermostat at the body-temperature. A number of such experiments showed that from a mixture of muscle and pancreas there may be prepared a cell-free fluid which so alters grape-sugar that in so far as its power to reduce copper salts is concerned its presence can no longer be demonstrated. Neither the pancreas alone nor muscle alone is capable of effecting this decomposition of grape-sugar, at least in any appreciable amount. The quantity of sugar thus decomposed was shown comparable with that which is burned up in the body. Blood-serum exercises an inhibitory influence upon the enzyme, and perhaps contains an anti-ferment, thus preventing the burning of the sugar in the blood, where only heat could be developed but no work done. Cohnheim sums up what we regard as a most important contribution as follows: "In order to burn up sugar in the body the concerted action of two organs is necessary—the muscle and the pancreas. As this combustion can be carried on outside of the cells in a homogeneous solution, it must be the action of a ferment." The necessity for the constituents of two organs finds a rational explanation in Ehrlich's theory that for lysin-action **complement** and **intermediary body** are necessary; or one may think of the enzyme as existing in the pancreas in the form of zymogen, analogous to pepsinogen or trypsinogen, which is made active in the muscle only as it is needed. Cohnheim, naturally, saw that his solutions were sufficiently protected from bacteria during these experiments. Of the decomposition products of sugar he was able to show only carbon dioxid.

Cohnheim has thus added a very interesting number to the group of chemical decompositions occurring in the body which are brought about by agents called enzymes, whose mass is incomparably smaller than the masses which they decompose, and whose activity is apparently unimpaired by the work which they do. There is probably no subject of more general interest nor one which is more puzzling in the entire field of physiologic chemistry than **the manner of action** of these enzymes. Fortunately there are a number of inorganic agents called catalytic agents which are analogous in their action to the enzymes, and which act on forms of matter sufficiently simple to admit of accurate chemical examination. One of these, the action of colloidal platinum on hydrogen dioxid, has been the subject of a most interesting contribution from Bridig and Jkeda.¹ As is well known to physical chemists, the velocity of a chemical reaction which involves only one substance obeys a very different law from that of a reaction involving two substances. By a study of the velocity of the decomposition of hydrogen dioxid on colloidal platinum Bridig and Jkeda were forced to conclude that the reaction involved only one substance, *i. e.*, the hydrogen dioxid, and that the other substance present, the colloidal platinum, does not

¹ Zeit. f. physiol. Chem., 37, p. 1.

at any time change its active mass, *i. e.*, does not combine with the hydrogen dioxid which it causes to decompose. We are therefore only a step from the hypothesis that catalytic agents are not forms of matter but forms of energy.

Bridig and Jkeda proceed with some caution to draw an analogy between the catalytic agents and the organic enzymes, showing that many substances (notably hydrocyanic acid) which are poisonous to enzymes also retard the decomposition of hydrogen dioxid by colloidal platinum.

Cassel and Loevenhart¹ take issue with Bridig and Jkeda upon this point. They study the influence of a large number of substances on the **reaction between hydrogen dioxid and other catalytic agents**, such as finely divided silver, silver oxid, thallium, and copper. They find that the reaction is in general retarded by the introduction of any neutral salt whose acid constituent forms an insoluble salt with the catalyzer. Thus sodium chlorid, ammonium chlorid, and potassium bromid greatly inhibit the catalytic action of silver. From a large amount of such evidence Cassel and Loevenhart conclude that the inhibition of the catalytic decomposition of hydrogen peroxid by metals is in many cases due to the formation of thin, insoluble, protective films over the surface of the metal, the formation of which is brought about by the action of the inhibitor on the metal. The inhibitory effect of those substances, many of which happen to be poisons, in nowise indicates any real analogy between the finely divided metals and the soluble ferments, so that use of the term "platinum poison" in this connection is altogether misleading and fallacious.

Kutscher and Lohmann² note that the proteid decomposition products formed by the **autodigestion of dead yeast-cells** are the same as those formed by the **autodigestion of pancreatic cells**. This analogy, which has been established by Kutscher's previous work (H.S. 32.59), naturally suggests the existence in the yeast-cells of an enzyme identical with or closely related to trypsin. If this be true, the enzyme of yeast should be capable of splitting lecithin, and, indeed, by the application of one of Kutscher's splendid analytic methods to the products of the auto-digestion of yeast, Kutscher and Lohmann were able to prepare and analyze the gold compound of cholin. The same authors were able to show that no such enzyme exists in the mucosa of the pig's stomach, and also that the brain, which is rich in lecithin, produces no cholin by autodigestion.

Delezenne and Pozerski³ find that **serum which contains chloroform dissolves casein** (and also gelatin⁴); they suppose that the anti-ferments of the serum are destroyed by the chloroform, and that then the normally present proteolytic enzyme becomes active. The serum is active after removal of the chloroform; normal serum inhibits the action again. Finally the proteolytic enzyme of the serum is also destroyed by the chloroform.

¹ Am. Chem. Jour., 29, pp. 397 and 563.
² C. B. Soc. Biol., 55, 690; 693.

³ Zeit. f. physiol. Chem., 39, 313.
⁴ Ibid., 327.

Malfitano¹ believes that the **enzyme of anthrax** which acts upon coagulated proteid is not the same as that which liquefies gelatin; the latter is more powerful than pancreatic juice.

Hensel² reports on work done by himself and Darrilewski on **antipepsin** which they obtained from the mucous membrane of the stomach. This antibody does not destroy the pepsin, but simply inhibits it; it has no action on other fermentations. The authors think that the presence of the antipepsin explains why the stomach does not digest itself.

H. Sachs³ obtained a serum which inhibits the action of pepsin upon gelatin. The serum was obtained by injecting pepsin into the peritoneal cavity of a goose.

Glaessner⁴ finds that the **antitryptic action of the blood** differs from the blood-serums and trypsins of different animals; it is strongest against the trypsin of the same species. The quantity in the blood increases during digestive activity; this seems to serve the purpose of destroying any trypsin which may be absorbed. The antitryptic action is associated with the euglobulin fraction of serum proteids.

Ascola and Bezzola⁵ find that the action of the **antitrypsin of the blood** is greater toward the kinose; it is less active toward the inactive pancreatic juice. Delezenne⁶ also found the action to be exerted chiefly on the kinose.

Bondi⁷ reports the presence of a number of **enzymes in the amniotic liquid**; among these were pepsin (no trypsin), fibrin ferment, lipase (in 4 of 7 cases), a diastatic ferment, and one splitting salol. H_2O_2 was decomposed by the liquid. Rennin and true oxidases were not found. The author does not think that these fermentations have an important action in the maceration of dead fetuses.

Some interesting experiments on the **decomposition of salol** into salicylic acid and phenol by human milk and the milk of asses are described by Desmouliens.⁸ The author considers this decomposition to be simply a process of saponification and not due to the action of an enzyme (as was supposed to be the case by Nobécourt and Merklen), for it occurs in artificially prepared solutions of phosphates of the requisite and simultaneous acidity and alkalinity.

Portier⁹ finds that the blood of the dog and rabbit causes **glycolysis of dextrose**, galactose, levulose, mannose, and maltose, but not of sucrose, lactose, sorbose, arabinose, and xylose.

Lipolytic Action of the Serum.—Pottevin¹⁰ finds that the addition of blood-serum intensifies the action of pancreatic extracts on fats; this action is attributed to the salts of the serum, for it occurs after acidifying, boiling, and filtering the serum. Fats simply shaken with pancreatic juice or extracts and then thoroughly washed, rapidly undergo saponification when suspended in serum. The author suggests that the fat which enters the circulation has pancreatic steapsin attached to it in quantity

¹ C. R. Soc. Biol., 55, 841.

² See Biochem. Centralbl., 1, 404.

³ Fort. d. Medicin, 20, 425.

⁴ Hofmeister's Beitr., 4, 79.

⁵ Centralbl. f. Bakter., 33, 783.

⁶ C. R. Soc. Biol., 55, 132.

⁷ Centr. f. Gynäk., No. 21.

⁸ Jour. de Pharm. et de chim., 17, 232.

⁹ C. R. Soc. Biol., 55, 191.

¹⁰ Compt. rend., 136, 767.

sufficient to cause saponification in the blood, and so its rapid disappearance.

Doyon and Morel¹ report experiments on the **saponifying action of serum** upon a number of esters; one of the observations was that while serum saponifies monobutyryl, it does not saponify normal fats, such as olein.

Benech and Guyot² found **lipase in the gastric juice** an hour after a test-meal. The ferment hydrolyzed monobutyryl; its action was favored by the presence of the normal amount of HCl.

A. C. Hill³ makes another contribution to the subject of the **reversibility of enzyme action**; the experiments were made with yeast extracts and with pancreatic diastase and taka-diastase. It was found that the synthetic action of a maltose containing yeast extract on glucose resulted in the formation of two isomeric bioses—one, not hitherto described, which is called revertose; the other, although not isolated, seemed to be maltose. Both taka-diastase and pancreatic ferments have a reversible synthetic action on glucose. The author gives a brief résumé of the work of others on the reversibility of enzyme action which has appeared since his first publication; he thinks that these observations, as well as his own more recent ones, make it very probable that the view he put forward in 1898 is a correct one—namely, that all ferment actions are reversible.

Experiments on the reversibility of lipolytic action are described by Pottevin.⁴ The experiments were made with glycerol extracts of the pancreas, which were employed in such excess that the quantities of glycerol and H₂O produced or absorbed by ferment action did not modify its composition to any marked extent. Oleic acid added to this mixture was partially esterified, while mono-olein was partially split. In both cases a condition of equilibrium was reached in which the same relative value obtained for free and combined acid. This relation could be made to vary by adding water to or removing it from the mixture.

Bach and Battelli⁵ consider the **chemical transformations in the body** to be mainly due to two sets of enzymes, hydrolytic and oxidizing. They consider the liberation of CO₂ from dextrose to be due to hydrolysis, never to oxidation. The liberation of H₂O is oxidative, and is thus a source of energy. It is assumed that dextrose is first decomposed by the hydrolytic enzyme into lactic acid, then into alcohol and CO₂. The alcohol is subsequently oxidized by the oxidizing enzyme.

Battesti and Barraja⁶ make an interesting contribution to the subject of the **soluble ferments in the human kidney**. The kidneys were obtained fresh from accident cases and extracted with glycerol; the following ferments were found: amylose, sucrose, casease, and oxidase. The occurrence of a peptic ferment and of lipase is considered doubtful. The extracts decomposed the following: aspirin, tannigen, and mercury albuminate; administration of these drugs led to albuminuria.

¹ C. R. Soc. Biol., 55, 682.

² C. R. Soc. Biol., 55, 719.

³ Jour. Chem. Soc., 83, 84, 578.

⁴ Compt. rend., 136, 1152.

⁵ C. R. Soc. Biol., 55, 732; Compt. rend., 136, 1351.

⁶ C. R. Soc. Biol., 55, 820.

The origin of the proteolytic enzyme of the urine was investigated by Matthés.¹ There was some doubt whether this ferment was pepsin or an autolytic ferment which had been absorbed. Matthés' experiments show that it is pepsin, for after the extirpation of the stomach (dog) it disappeared from the urine.

Vernon² has contributed a paper on the precipitability of pancreatic ferments by alcohol. A partial separation of the diastatic and tryptic ferments was obtained; the former is not so readily precipitated as the latter, and is destroyed to a greater extent in the processes of precipitation and resolution. No such separation of tryptic and rennetic ferments was obtained; it is suggested that these ferments are not separate entities, but form a complex group, of which various side-chains possess different powers, which may be destroyed separately. The connection between proteolytic and rennetic activity is close in many ferments, the latter action being sometimes accidental and occurring where any possibility of acting on milk is absent (in certain fishes, in the fruit of many plants, etc.).

Richter³ found that electric conductivity of the blood does not undergo characteristic changes in experimental disturbances of the renal functions; as a rule, there was no change after ablation of the kidneys and experimental nephritis, though at times there was an increase. In a case of eclampsia studied there was no retention of electrolytes in the blood, while those of the urine had an unusually high value. The author considers the electric conductivity method valuable for the study of the urine, less so for that of the blood.

Herter and Wakeman⁴ report experiments on the origin of cholesterol in gallstones. Solutions of mercuric chlorid were injected into the gallbladder of dogs; after 2 to 5 days the wall of the gallbladder was found thickened, the solids of the bile were decreased, but the cholesterol was increased.

In experiments in which foreign bodies were introduced into the gallbladder of dogs and rabbits Carmichael⁵ found a deposition of calculus-forming substances. The substance deposited was mainly calcium carbonate mixed with proteid, leukocytes, and desquamated epithelial cells. No cholesterol was found. These changes occurred whether microorganisms were present or not.

Harley and Barratt⁶ found that gallstones placed in the healthy gallbladder of a dog disappear in from 6 to 12 months in the absence of bacteria. If cholecystitis was present, the gallstones were not altered.

Sollmann⁷ reports the results of the analysis of the fluids of two cases of hydrops cystidis felleæ, and reaches the following conclusions: As the result of a congenital obstruction of the cystic duct or of the obstruction by gallstones, the gallbladder contains a dilute solution of mucin of the molecular concentration of the serum; bile-acids, pigments, ferments,

¹ Arch. exp. Path. u. Pharmakol., 39, 107.

² Jour. Physiol., 29, 302.

³ Charité Annalen, 27 (ii).

⁴ Proc. Soc. Exper. Biol. and Med., N. Y., Amer. Med., May 2, 1903, page 707.

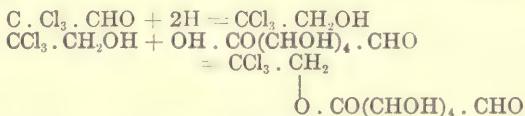
⁵ Jour. Path. and Bac., 8, 453.

⁶ Jour. Physiol., 29, 341.

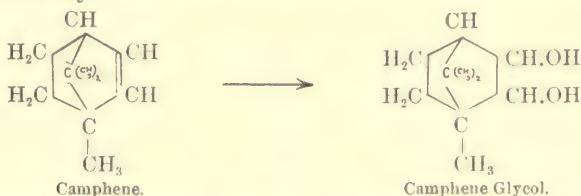
⁷ Amer. Med., March 14, 1903.

sugar, and nucleoalbumin were absent, and there were but traces of coagulable proteids.

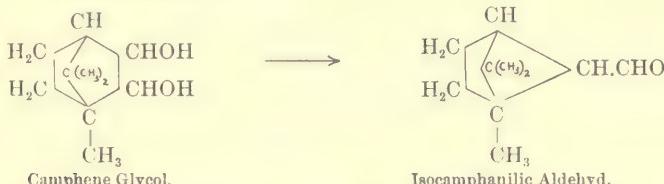
A series of contributions by Fromm, Hildebrandt, and Clemens¹ on the destiny of cyclic terpenes in the organism represent the clearest study of paired glucuronic acids yet made, and offer a beautiful illustration of the chemical resources of the animal body. Glucuronic acid can be paired only with compounds of an alcoholic character, so that many substances must first be changed into alcohols before pairing can occur. This is very beautifully illustrated by chloral hydrate, which is changed by reduction to trichlorethyl alcohol. This is then paired with glucuronic acid and appears in the urine as the well-known urochlorallic acid, thus:



In the case of the terpenes the alcoholic character is produced by oxidation, while secondary changes are different for each class of terpenes. Owing to the poisonous nature of many of the terpenes and to the physical properties of the products formed, a study of the changes which they undergo was found extremely difficult, but in the case of camphene the authors were able to show that the changes are as follows: By the introduction of two atoms of oxygen camphene glycol is produced, the oxidation occurring in the body at the points where the terpene is oxidized outside of the body.



The camphene glycol is then conjugated with glucuronic acid and the paired acid occurs in the urine: $\text{C}_{16}\text{H}_{26}\text{O}_8$. The potassium salt of this acid was isolated and analyzed. On boiling such a urine with hydrochloric acid the paired acid splits into its components and the camphene glycol being very unstable loses water and by an obvious rearrangement changes to isocamphanilic aldehyd:

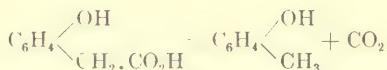


This aldehyd was isolated as a beautifully crystalline compound which reduces metallic salts and by treatment with permanganate yields an

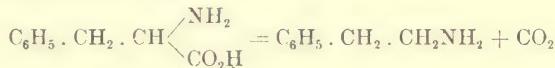
¹ Zeit. f. physiol. Chem., 36, 441; 36, 452; 37, 189.

acid which is identical with Bredt and Jayeski's isocamphanilic acid. The reducing power of the urine is therefore due to both components of the paired glucuronic acid. The authors state in general that pseudo-terpenes (camphene, sabinen) suffer in the body simple hydroxylating, while orthoterpenes (limonene) and various camphors also change a methyl group into a carboxyl group.

Instances of the loss of carbon dioxid from chemical compounds under the influence of ferments are not infrequent. Baumann¹ refers the formation of putrefactive paracresol to previously formed paroxyphenyl-acetic acid—



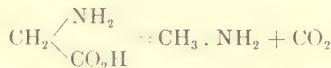
and Spiro² looked upon phenylethylamin as having its origin in the phenylalanin group of gelatin.



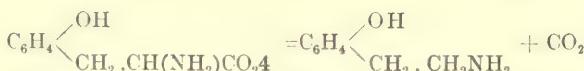
Moreover, Ellinger³ was able to show the formation of cadaverin from lysin and of putrescin from ornithin under the influence of putrefactive bacteria.



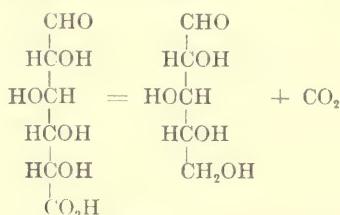
To the same category without doubt belongs the methylamin which Emmerling observed in the putrefaction of proteids containing a glycocoll group,



and the paroxyphenylethylamin which Emerson⁴ has obtained by the action of trypsin on tyrosin and also in a peptic digestion of serum-albumin.



The most interesting of all the reactions of this class is that given by Salkowski and Neuberg,⁵ who show that ordinary putrefactive bacteria can change d-glucuronic acid into l-xylose.



¹ Ber. d. d. chem. Ges., 7, 282 and 553. ² Hofmeister's Beitr., 1, 350.

³ Ber. d. d. chem. Ges., 31, 318, and Zeit. f. physiol. Chem., 29, 334.

⁴ Hofmeister's Beitr., 1, 501.

⁵ Zeit. f. physiol. Chem., 36, 261.

This decomposition is worthy of note, since one might have predicted on purely theoretic grounds that a pentose formed in this way would have the configuration of l-xylose. As glucuronic acid results from the oxidation of glucose, it is possible that by an obvious series of transformations the l-xylose which enters into the composition of the nucleic acids may be formed in the body from glucose. Salkowski and Neuberg¹ claim that this is the first instance of the transformation of a sugar of the dextro series into one of the levo series. This is *literally* true; but Küster very properly states that the naming of l-xylose is somewhat arbitrary, and from the point of view here taken the substance might more properly be called d-xylose. Up to the fourth carbon atom the two substances have the same configuration and should have the same designation.

From experiments of P. Mayer² on the oxidation of the carbohydrate acids it appears probable that in some cases an increase in the amount of **glucuronic acid** excreted may indicate incomplete oxidation of dextrose, for it was found that dextrose can be directly oxidized in the organism to this acid. Gluconic acid is not completely oxidized in the body, saccharic acid being excreted in the urine. The CH₂OH group may thus be oxidized in the organism, but the CO₂H group is not affected.

According to Lépine and Boulud,³ the **glucuronic acid of the dog's blood** exists exclusively in the corpuscles, none being found in the plasma. The compound in the corpuscles does not reduce copper sulfate; it is best split with tartaric acid at 120°. In defibrinated blood some glucuronic acid was found in the serum. After a meat diet more was found in the blood of the right ventricle than in that taken from the carotid.

Mandle and Jackson⁴ consider it probable that the **source of glucuronic acid** is proteid and not sugar (as believed by Mayer). Camphor was given to fasting dogs and the camphoglucuronic acid of the urine estimated; the amount was lessened by feeding with dextrose, but increased by feeding with meat. Glucuronic acid was not found in the blood (cf. above), and perfusion experiments pointed to the kidney as the seat of the synthesis of the glucuronates.

P. Mayer⁵ makes a contribution to the subject of the **excretion of glucuronic acid** in which the methods of those (notably Bial) who maintain that glucuronic acid occurs in the feces, are criticized.

Von Leersun⁶ found glucuronic acid in **icteric urine**; its presence accounts for some of the reducing properties of the urine in jaundice. The author had previously found⁷ small amounts of glucuronic acid in the bile.

A very exhaustive critical study of **glycogen** is made by Pflüger.⁸ The author inclines to the view that glycogen is formed exclusively from carbohydrates (and perhaps also from glucosids, but not from pentoses), not from fats and proteids which do not contain a carbohydrate residue.

¹ Zeit. f. physiol. Chem., 37, 221.

² Zeit. f. klin. Med., 47, Nos. 1 and 2.

³ Compt. rend., 136, 1037.

⁴ Am. Jour. Physiol., 8, xiii.

⁵ Berl. klin. Woch., 40, 292.

⁶ Hofmeister's Beitr., 3, 574.

⁷ Ibid., 522.

⁸ Pflüger's Archiv, 96, 1.

He thinks the cause of diabetes mellitus is a disturbance of the nervous mechanism which regulates the metabolism of sugar.

Pflüger¹ has reinvestigated the question of the **occurrence of glycogen in the fetal liver**, which, as is well known, was answered in the negative by Bernard. By the use of his new method² (solution of the organ in strong potassium hydroxid, precipitation with alcohol, and inversion to dextrose) glycogen was always found in the livers of embryonic calves, lambs, and pigs; the amount was usually small, while that present in the muscle was large. The explanation offered for the smallness of the amount in the liver is that the animals usually investigated (slaughter-house animals) have, as a rule, received insufficient food shortly before being killed; this leads to a transference of the glycogen from the liver to the muscles.

Grube³ observed a **formation of glycogen** in the artificially perfused liver of the cat when dextrose was added to the blood; the liver retained this power for some time after isolation from the body. The liver was found to be very sensitive to interference with its circulation; cessation of the blood-flow for a few minutes caused a transformation of the glycogen into sugar.

Stookey⁴ reports experiments on the **formation of glycogen from glucoproteids** and other proteids, the object being to determine whether glycogen is formed from proteids other than the glucoproteids. The experiments were performed upon hens and showed that after the feeding of considerable quantities of casein (which does not yield a typical carbohydrate on cleavage) for several days there was, in 6 cases, a storage of glycogen in the liver. Feeding experiments with ovomucoid, pancreas, nucleoproteid, and chondrin did not give very positive results.

Reicher⁵ describes methods of obtaining crystallized **hemoglobin**. Crystals were more easily obtained from oxalated and from asphyxial blood than from ordinary blood. Acetic ether and ethyl ether were the best laking agents. Crystallization is usually retarded in a mixture of bloods, and if the crystalline forms are different one usually begins to separate before the other, and the form of the crystal may be completely changed.

Hüfner⁶ reports further experiments on the **oxygen capacity of hemoglobin**. He reaches the same figure as in former work; viz., 1.34 cc. per gram hemoglobin. Sources of error in the work of those who have obtained different results (Haldane and St. Martin) are pointed out.

Langstem⁷ shows that about 90 % of ingested l-phenylalanin appears in the urine of alkaptonuria patients as **homogentisic acid**. This substance is undoubtedly connected with a disturbance of nitrogenous metabolism since it can only be derived from proteids, and tyrosin has hitherto been assigned as its precursor.

Blumenthal and Rosenfeld⁸ report experiments in support of the

¹ Pflüger's Archiv, 95, 19.

² Jour. Physiol., 29, 276.

³ Am. Jour. Physiol., 9, 97.

⁴ Zeit. f. physiol. Chem., 37, 513.

⁵ Ibid., 93, 163.

⁶ Am. Jour. Physiol., 9, 138.

⁷ Arch (Anat. u.) Physiol., 1903, 217.

⁸ Charité Annalen, 27 (ii), 46.

view that **indican can originate in the body by other than bacterial decomposition of proteids.** The experiments were made upon rabbits, whose urine is normally free from indigo-forming substances. A considerable excretion of indican was caused by agencies which increase proteid decomposition (starvation, injection of phloridzin with simultaneous underfeeding). No indol was found in the intestine.

The **relation of indicanuria to diseases of the stomach** is discussed by Carles.¹ No indican was found in cases of hyperchlorhydria (probably on account of the antiseptic action of HCl), but it was usually found in hypochlorhydria and was very marked in anachlorhydria.

A. Schmidt² gives a method for the **detection and determination** (with the spectroscope) of **indol** in the feces by means of Ehrlich's dimethylamidobenzaldehyde reaction.

A very important contribution to the subject of the **intracellular toxins** of some of the pathogenic bacteria is made by Vaughan.³ By means of large incubating tanks the cellular substance was obtained in large quantities. The cell-substance of *Micrococcus prodigiosus*, *Sarcina lutea*, *Sarcina aurantiaca*, *Bacillus coli communis*, *Bacillus diphtheriae*, and *Bacillus anthracis* was found to be more or less toxic to rabbits and guineapigs. The cell-substance of the colon bacillus, for example, after extraction with alcohol and ether and complete desiccation, fills these animals when injected subcutaneously or intraperitoneally in the proportion of 1: 45,000. A soluble toxin was split off by heating with 1 % sulfuric acid. The intracellular toxin of anthrax produces lesions characteristic of anthrax. The intracellular and the soluble toxins of the diphtheria bacillus are not identical, and ordinary antitoxin does not protect against the former. A germ may produce a slightly virulent soluble toxin, but a highly active intracellular toxin.

The subject of the **iodin-binding groups in proteids** is discussed by Oswald.⁴ Gelatin (which yields no tyrosin) is able to bind 1.67 % of iodin. Products of tryptic digestion of proteids take up some iodin after separation of the tyrosin. Hence the author concludes that tyrosin is not the only iodin-binding group in the proteid molecule. Proteids from which tyrosin can be obtained, however, take up much more iodin than do other proteids; casein, e. g., binds 12.44 %. Tyrosin itself seems to take up 3 iodin atoms.

Justus,⁵ making use of a microchemic method, finds **iodin** to be **widely distributed in animal and vegetable tissues.** Thus, it was found in the thyroid, thymus, lymph-glands, kidney, spleen, testis, and suprarenal body. It is chiefly present in the cell-nuclei.

Neumann⁶ describes a method of ashing and determination of ash constituents which he claims is more exact and easier of execution than those already in use, and of special value where small quantities of iron are to be determined in the presence of excessive quantities of organic matter, as iron in the blood and in the urine. By an application of the

¹ Rev. de Med., 1903, 297.

² Jour. Am. Med. Assoc., 1903, p. 838.

³ Virchow's Archiv, 170, 501.

⁴ Münch. med. Woch., 50, 721.

⁵ Hofmeister's Beitr., 3, 514.

⁶ Zeit. f. physiol. Chem., 37, 115.

method to normal and pathologic urine, Neumann and Mayer¹ find a mean value of 0.983 mg. of iron per day in normal urine, and while in various pathologic urines the amount is variable, yet, in diabetic urine, for every 100 grams of sugar, there are 2.5 mg. of iron. In the cases examined the sugar varied between 64 grams and 198 grams in the day's urine. Yet the ratio of iron to sugar was always the same. Neumann and Mayer believe that this finds its most plausible explanation in the assumption that the sugar and iron both result from a decomposition of nucleic acid.

A new base **karnosin** ($C_9H_{14}N_4O_3$) was isolated by Gulewitsch and Amiradighi² from Liebig's extract of meat. The base has properties very similar to those of arginin.

The **Kjeldahl method** is so well known that, aside from laboratory accidents, one can scarcely understand how its use can lead into error. However, Kutscher and Steudel³ claim that with a number of substances, including creatin, creatinin, uric acid, lysin, and histidin, the method gives numbers for nitrogen considerably below those required. Beyer, Fingerling, and Morgan⁴ repeat the work of Kutscher and Steudel with creatin and have no difficulty in obtaining satisfactory results. They discuss the method and note many precautions that should be observed in its use.

Miellère⁵ finds that **traces of lead are usually present in the organism**, especially in the liver and spleen. In a second paper⁶ the distribution of lead in cases of plumbism is discussed. Most was found in the hair (especially that of the pubes), teeth, and liver; next came the liver and gray matter of the brain, and then the kidneys.

The products of the **autolysis of a leukemic spleen** are described by Schumm.⁷ Lysin, leucin, tyrosin, and ammonia were found; aspartic and glutanic acids and thymin were not found. The large amount of albumose present at first diminished as autolysis proceeded, but the amount of hydrolytic products formed was much greater than could be accounted for in this manner; they arose probably to a large extent from the coagulable proteids.

Reh⁸ found the following as decomposition-products of the **autolysis of lymph-glands**: ammonia, leucin, tyrosin, thymin, and uracil; lysin was not found.

Metabolism.—An important contribution to the subject of **proteid metabolism** in man is made by Landergren.⁹ Experiments were made in which a sufficient amount of oxidizable food was given, but in which the N was reduced to a minimum (usually under 1 gram). With this diet the N-excretion was much less than in simple starvation. In the latter there is, after 4 days, a gradual fall of the urine-N in 7–9.5 grams on the tenth day. If only N is absent in sufficient quantity in the diet, then the N-excretion is less; but the amount of the excretion depends upon whether fat or carbohydrate is given. With fat alone the values

¹ Zeit. f. physiol. Chem., 37, 143.

² Physiol. Russe, 2, 114.

³ Zeit. f. physiol. Chem., 39, 12

⁴ Zeit. f. physiol. Chem., 39, 329.

⁵ C. R. Soc. Biol., 55, 517.

⁶ Ibid., 518.

⁷ Hofmeister's Beitr., 3, 576.

⁸ Hofmeister's Beitr., 3, 569.

⁹ Skand. Arch. Physiol., 14, 112.

were 8.8 grams on the third day, 8.86 on the sixth, and 9.64 on the seventh; with carbohydrates there were, on the third day, but 4.3 grams N; 3.36 on the sixth day, and 3.34 on the seventh. From these experiments the author questions the correctness of the usually accepted views as to the proteid-sparing function of the carbohydrates. He considers the latter to be necessary to the body; when they are not given, the body decomposes proteids in order to obtain them, the N of the latter appearing in the urine. A formation of carbohydrate from fat is considered unproved. The urine-N of ordinary starvation is believed to result from the following three processes: (1) From unavoidable tissue consumption; this yields cc. 3.5 grams N per day. (2) From the proteid decomposition necessary to the formation of dextrose; this varies from 2 to 6 grams per day. (3) From the proteid decomposition necessary for the production of energy; this is very considerable after the fat is used up.

E. Voit¹ maintains that the **calorific value of food materials** can be calculated from their oxygen capacity, *i. e.*, from the amount of oxygen taken up by their oxidation. The numbers so obtained differ but little from those which are the results of direct experiment. Krummacher² shows that the same method can be applied, without great error, not only to chemic individuals, but also to mixtures of similar composition.

Rosemann³ publishes a supplementary article on the **influence of alcohol on proteid metabolism** in which he answers criticisms made upon his earlier work by Kassowitz. The author considers that recent work confirms the contention that alcohol is a proteid-sparing food.

Rosenqvist⁴ reports experiments on the **proteid metabolism in pernicious anemias**. Special attention was given to the anemia caused by Bothriocelphalus. There were in all cases periods of greatly increased proteid destruction; sometimes the N-loss amounted to 8.8 grams per day. At other times there was a laying on of proteid. After the expulsion of the worm the increased destruction of proteid ceased and there was a very considerable storage of proteid even under unfavorable conditions. The increased destruction of proteid is ascribed to the formation of poisons by the worm; the periods of storage of proteid to the establishment of an immunity to the poison. Similar results were obtained in 3 cases of cryptogenetic pernicious anemia. The excretion of purin bodies varied greatly; sometimes it was greatly increased (to 0.55 gram purin-N, for example), the increase being due to an increased destruction of tissues rich in nuclei.

Hirudin is the name given by Jacobi to the substance **contained in leeches** which prevents the coagulation of blood. According to the investigations of F. Franz,⁵ hirudin is an albumose with properties approaching those of a peptone. The method of preparing the substance is given in detail.

According to Arnold and Mentzel,⁶ **hydrogen dioxid in milk** can be readily detected by mixing 10 cc. of the milk with 10 drops of a 1 %

¹ Zeit. f. Biol., 44, 345.

² Ibid., 362.

³ Pflüger's Archiv, 94, 557.

⁴ Zeit. f. klin. Med., 49.

⁵ Arch. f. exp. Path. u. Pharmacol., 49, 342.

⁶ Zeit. Nahr. Genussen., 6, 305.

solution of vanadic acid in dilute sulfuric acid. If hydrogen dioxid is present to the extent of 0.01 gram in 100 cc. of milk, a red coloration appears. If titanic acid instead of vanadie is used, a yellow coloration results.

Bordas and Raczwowski¹ find a great diminution of the lecithins in heated milk. When the milk was heated over the free flame at from 60° to 95° the loss was 14 % to 28 %; when heated in an autoclave to 105°–110° the loss was sometimes 30 %. When heated for 30 minutes at 95° on the water-bath the loss was 12 %.

Umber² reports finding a mucin ("serosamucin") in ascitic fluid. He considers it to be a secretion of the inflamed serosa. Various autolytic products of the proteids were also found.

V. Fürth³ reports an extensive series of experiments on the coagulation of muscle-plasma. Special search, by various methods, for a "rigor ferment" was made, but with negative results. Extracts of muscles which had gone into rigor had no special accelerating influence upon the appearance of rigor in the muscles of other animals. No evidence for the existence of a zymogen of such a ferment could be obtained. The acid formed during the rigor was not found to be responsible for the onset or for the disappearance of the rigor, although small amounts of acid hastened its onset. Calcium salts accelerate the coagulation of muscle-plasma, but were not found to be indispensable. Sodium fluorid hastened the appearance of rigor, but inhibited the coagulation of muscle-plasma.

Folin⁴ shows the inadequacy of the theory that rigor mortis is due to a coagulation of muscle-proteids. Muscles which had gone into rigor from exposure to cold (according to Brücke's method) and fresh living muscle were extracted with 0.7 % sodium chlorid solution; the two extracts had the same properties.

Nucleic Acids.—Mendel, Underhill, and White⁵ find that the nucleic acid from the wheat embryo resembles the guanylic acid of the pancreas in its physiologic action, causing a fall of blood-pressure, lessening of blood coagulability, an increased lymph-flow, etc. Its ingestion in man is followed by an increased output of uric acid, and in the dog by the excretion of allantoin.

P. A. Levene⁶ describes a new method for the isolation of nucleic acids and studies the hydrolytic products of the acids obtained from the pancreas and spleen. Of the xanthin bases, both acids yield guanin and adenin; of the pyrimidin derivatives, thymin and cytosin. Glycerin could not be found and probably does not exist among the hydrolytic products of either of the nucleic acids. Curiously enough, when the pancreas was submitted to self-digestion Levene found uracil in place of the thymin. Hence the ferment not only hydrolyzes the nucleic acid, but splits off a methyl group at the same time.⁷

Wohlgemuth⁸ shows that the sugar which can be split off from the

¹ Ann. chim. anal., 8, 168.

² Zeit. f. klin. Med., 48, 5 and 6.

³ Hofmeister's Beitr., 3, 543.

⁴ Am. Jour. Physiol., 9, 374.

⁵ Am. Jour. Physiol., 8, 377.

⁶ Zeit. f. physiol. Chem., 37, 407.

⁷ Zeit. f. physiol. Chem., 37, 527.

⁸ Zeit. f. physiol. Chem., 37, 475.

nucleoproteid of the liver is l-xylose and therefore identical with the carbohydrate which Neuberg obtained from the nucleoproteid of the pancreas. l-Xylose therefore constitutes the preponderance of the pentose material in the body and can have nothing to do with the pentose of the urine, which has been shown to be r-arabinose, a substance of different geometric configuration. We have thus good reason for assuming that in pentosuria the sugar is found synthetically in the body, a conclusion which has already been drawn by Neuberg and Wohlgemuth¹ from results obtained after feeding animals with racemic arabinose.

Triticonucleic acid is the name given by Osborne and Harris² to the nucleic acid of the wheat embryo which they have lately isolated and submitted to a most thorough chemic examination. From analyses of a large number of preparations obtained by various methods they are led to the formula $C_{41}H_{61}N_{16}P_4O_{31}$, and find that on hydrolysis only two of the xanthin bases are produced—namely, guanin and adenin, and these in chemically equivalent quantities. Of the pyrimidin derivatives they easily show uracil, but not thymin, thus showing a close relation between triticonucleic acid and the nucleic acid from yeast. As tests for formic and levulinic acid proved negative the authors conclude that their nucleic acid does not contain a hexose group. On the other hand, a pentose group was easily shown by the formation of furfurol, on boiling the nucleic acid with mineral acids. From a consideration of a large amount of evidence which it would be impossible to take up here, Osborne and Harris are led to a probable structural formula for the nucleic acid.

All observations hitherto published concerning the **optical activity of albuminous substances** have led to the conclusion that the bodies thus designated, whether derived from the vegetable or animal kingdoms, without a single exception, deviate the plane of polarization to the left, no case having been hitherto known of a dextrogyrous, a racemic, or an otherwise inactive albuminous substance. Gamgee and Hill³ study for the first time the optical properties of oxyhemoglobin and carbon monoxid hemoglobin and find both of these proteids dextrogyrous, having the same specific rotation: viz., (a) C = +10° for light of mean wavelength corresponding to the Tranenhofer line C. Gamgee and Jones⁴ later studied the optical properties of six substances obtained from various glands, including Hammarsten's nucleoproteid β from the pancreas and Lillienfeld's nucleohiston from the thymus. All six of the preparations which were examined gave on hydrolysis albuminous bodies, phosphoric acid, and purin derivatives, and all contained iron in stable combination. They are therefore all nucleoproteids in the wide sense of the term. The methods of preparation were such as to exclude all dextrorotatory substances which are not of a proteid nature, and all preparations were shown to be free from substances which reduce Fehling's solution even on prolonged boiling. Nevertheless, all these substances were found to be dextrorotatory, having specific rotations for light of the wave-length

¹ Zeit. f. physiol. Chem., 35, 41.

³ Proc. Royal Soc., lxxi, p. 376.

² Zeit. f. physiol. Chem., 36, 85.

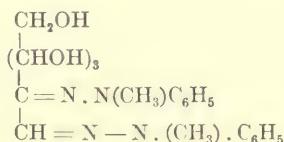
⁴ Hofmeister's Beitr., 4, p. 10.

of D which vary from 37.58°, that of the nucleohiston of the thymus gland, to 97.9°, that of Hammarsten's nuclein obtained from the pancreas and described by him as protein.

Osborne¹ finds the triticonucleic acid which he obtained from the wheat embryo also dextrorotatory, although the degree of rotation is considerably influenced by the concentration. Gamgee and Jones² find that the well-known nucleic acid of the thymus which was first prepared by Kossel and Neumann is also powerfully dextrorotatory. In this case the rotation within wide limits is independent of concentration, but varies with the acidity of the solution. The rotation reaches a maximum in a slightly acid fluid and then continually decreases either by the addition of acids until a turbidity is produced, or by ammonia until the solution finally becomes inactive. Frazee³ has already noted the alteration of the rotation of protein solutions produced by acids or alkalies, an alteration which probably results from chemic alterations produced by the acid on alkali. Gamgee and Jones find, however, that in case of the thymus nucleic acid, the loss of activity brought about by either acid or alkali is restored by the addition of alkali or acid as the case requires.

Donze and Lambling⁴ report an investigation on the **organic constituents of the urine** which are not determined by the ordinary analytic methods. The total organic matter was determined and also the urea, uric acid, the ammonia, creatinin, and the xanthine bodies. The results show that from 16.0% to 34.1% of the organic matter was not determined; this corresponds to an average of 12 grams of organic matter per day. From 2.56% to 8.37% of the total N remained undetermined; much of this was probably contained in amidoacids and oxyproteinic acid. Oxyproteinic acid seemed to occur in larger amounts than uric acid or creatinin. The undetermined nonnitrogenous constituents probably consist largely of unfermentable carbohydrates.

Since d-glucose, d-fructose, d-mannose, and d-glucosamin all yield the same osazone, the phenylhydrazin test for glucose or fructose can be of no use in the case of fluids containing any one of the substances named. Neuberg and Strauss⁵ show that fructose alone forms an osazone with methylphenylhydrazin:



By the use of this compound it is possible to isolate fructose from animal fluids such as urine, blood-serum, etc., when these fluids contain other carbohydrates. The osazone crystallizes in fine yellow needles which melt at 158°–160° C.

All methods hitherto proposed for the estimation of β -oxybutyric

¹ Am. Jour. Physiol., ix, p. 69.

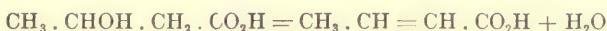
² Proc. Royal Soc., lxxii, p. 101.

³ Pflüger's Archiv, lxviii, p. 144.

⁴ Jour. Physiol. et Pathol. gen., 5, 225.

⁵ Zeit. f. physiol. Chem., 36, 227.

acid in the urine are both time-consuming and inaccurate. Darmstaedter¹ suggests the following method and gives analytic data to show that by its use more than 99 % of this constituent may be recovered. The method depends upon the conversion of β -oxybutyric acid into crotonic acid:



One hundred cubic centimeters of urine is made faintly alkaline with sodium carbonate and evaporated on the water-bath almost to dryness. The residue is washed into a liter flask with 150 cc. to 200 cc. of 52 % sulfuric acid and submitted to distillation, the volume being kept constant by the occasional addition of water. When the distillate measures 325 cc. it is extracted several times with ether, which is distilled off, and the residue heated for a few minutes at 160°, dissolved in water and titrated with tenth-normal caustic soda, using phenolphthalein. One hundred cubic centimeters of $\frac{N}{10}$ NaOH corresponds to 0.86 gram of crotonic acid. Crotonic acid $\times 1.21 = \beta$ -oxybutyric acid.

The recent literature on the relation of the pentoses to physiologic chemistry is discussed by Wohlgemuth.² Especially emphasized is the possible origin of the argon-pentoses from glucuronic acid. Bial³ describes a modification of his method for detecting pentoses in the urine. Four or 5 cc. of the reagent (which consists of 500 cc. 30 % HCl, 1 gram of orcin, and 25 drops of a 19 % solution of ferric chlorid) is heated to boiling and a few drops of the urine added; if pentoses are present the solution becomes a rich green. Neither normal nor diabetic urine, nor that containing easily decomposed glucuronates, gives this reaction. The entire subject of pentosuria is treated in a small monograph by Bendix.⁴ The chemistry and occurrence of the pentoses and their physiologic importance as well as their occurrence in the urine are discussed.

Gies⁵ reports experiments on peptic proteolysis with various equi-dissociated acids of the same conductivity as a 0.2 % solution of HCl. It was found that the nature of the acid itself is important, the anion modifying the action of the common cathion. The SO_4^- anion was especially injurious. A similar series of experiments is described by Larin.⁶ This author found hydrochloric acid to give the best results, and then, in the following order, (2) oxalic, (3) nitric, (4) sulfuric, (5) tartaric, (6) citric, (7) lactic, (8) formic, (9) malic, (10) acetic, (11) butyric, (12) valerianic. There was a general relation between the activity of the acids and their electric conductivity, but the parallelism was not complete. Krüger⁷ found that equivalent amounts of the chlorids of sodium, potassium, ammonium, calcium, and magnesium inhibit the action of pepsin to equal degrees. Pawlowsky⁸ found that alcohol in small quantities (0.5 % to 0.75 %, e. g.) inhibits the action of pepsin;

¹ Zeit. f. physiol. Chem., 37, 355.

² Biochem. Centralbl., 1, p. 533.

³ Deut. med. Woch., 29, 477.

⁴ "Die Pentosurie," Stuttgart, 1903; 60 pp.

⁵ Am. Jour. Physiol., 9, xvii.

⁶ Arb. d. med.-chem. Lab. Univ. zu Toursk, 1, 1.

⁷ Ibid.

⁸ Ibid.

beer and urine inhibit more strongly than corresponding quantities of alcohol. Tea and coffee also inhibit, the former more strongly than the latter. Pure caffeine has no action on pepsin.

The renal origin of the sugar in phloridzin glycosuria is shown by some experiments of Pavy, Brodie, and Siam.¹ Injection of phloridzin into one renal artery produced glycosuria in that kidney prior to and to a greater extent than from the other. Perfusion of a surviving kidney with blood containing phloridzin caused diuresis and glycosuria. Intravenous injection of phloridzin after removal of all the abdominal organs except the kidneys produced glycosuria. The amount of sugar in the urine cannot be accounted for by that which disappears from the blood; hence the authors conclude that the renal cells have acquired the power of producing sugar from some unknown constituent of the blood. The action is compared to that by which lactose is set free by the cells of the mammary gland. Experiments by Jackson² seem to point to a double origin of the sugar of the urine after the administration of phloridzin to dogs. In most animals suffering from pancreatic or phloridzin diabetes the ratio of the dextrose to the nitrogen in the urine is 2.8:1; in the dog, in phloridzin glycosuria, it is 3.75:1; but if camphor is given to the dog, the ratio falls to 2.8:1. The author found fatty degeneration of the kidney, but it was limited to the ascending loops of Henle; he is inclined to the view that the cells of these loops normally separate dextrose from some unknown constituent of the blood, and that when they degenerate the amount of sugar decreases.

A few experiments on organic phosphorus compounds and nutrition are reported by Billan and Stassano.³ Young rabbits of the same litter were fed in the same way except that some also received lecithin, others nucleic acid, and others sodium methylphosphinate. Those which received lecithin increased in weight most rapidly; then came those which had nucleic acid, and finally those with sodium methylphosphinate. The experiments were not, however, numerous, nor were the results so very marked.

Observations on 2 children to whom **roboret** (a vegetable proteid containing some lecithin) was given are described by Sommerfeld.⁴ The results show that this substance is excellently digested and absorbed by children, and that even in large quantities it does not irritate the kidneys; it was used extensively in cases of nephritis, being added to the milk-diet.

A number of papers have appeared on the **physical chemistry of the urine**. Thus J. H. Lang⁵ studied the electric conductivity of urine of a man on a proteid and lecithin diet and of same man on a carbohydrate diet. The conductivity was somewhat greater with proteid diet.

Clowes⁶ studied the relationship between the **freezing-point depression and the specific gravity of the urine** under varying conditions of metabolism. Simple methods for calculating the percentages of sugar and albumin from these factors are given.

¹ Jour. Physiol., 29, 467.

³ C. R. Soc. Biol., 55, 276.

⁵ Jour. Am. Chem. Soc., 24, 996.

² Am. Jour. Physiol., 8, xxxii.

⁴ Arch. f. Kinderheilk., 36, 341.

⁶ Am. Jour. Physiol., 9, 319.

Michaelis¹ finds that solutions of all proteids, if sufficiently concentrated, will inhibit, to some extent, **precipitin reactions**. As a rule the reaction is only delayed. Precipitin previously heated to 72° inhibits the reaction of fresh precipitin. This reaction is much more marked than the above and is strictly specific, the inhibition being observed only when the same precipitin is used in both cases. An excess of precipitable substance hinders the formation of a precipitate; the latter, if formed, dissolves on the addition of more precipitable substance. An excess of precipitin is without effect.

The "biologic" test for blood (the precipitin test) is discussed in detail by Graham-Smith and Sanger.² Attention is called to a number of sources of possible failure. Wassermann and Schütze³ think that an error can arise from the use of too strong solutions of precipitin. They propose a "precipitin unit." Austin⁴ also discusses the limitations of the method and gives many practical points concerning the preparation of the serum. He considers that hemoglobin or some substance dissolved out of the erythrocytes or leukocytes coincident with the hemoglobin is an active agent in the production of the precipitin.

Landsteiner and v. Eisler⁵ found a **precipitin for human urine** in the serum of a rabbit after the injection of 400 cc. human urine into this animal.

Rostoski and Saceonaghi⁶ report the **formation of albumoses and petone precipitins** by the injection of the products of the peptic and tryptic digestion of serum-albumin of the horse. The weakest reaction was with peptone. The precipitins were not destroyed by heat.

P. A. Levene⁷ makes an interesting contribution on the relation of proteids to their first digestive products, the **proteoses**. Specimens of proto- and deutero-proteose are prepared from gelatin by the action of various enzymes, pepsin, trypsin, and papain. The amount of glycocoll produced by complete hydrolysis of each of these gelatins and also of gelatin itself was determined by Fischer's method. Gelatin was found to yield 16.4 % of glycocoll while the various gelatoses gave from 17.07 % to 20.29 %. The inference is clear. The gelatoses contain fewer groups that produce glycocoll than does gelatin itself, so that by these various processes of digestion as the proteoses are split off, some other substance must be formed which is poorer in glycocoll groups than gelatin.

Mendel and Underhill⁸ find that pure proteoses prepared from different proteids retard blood-coagulation, cause a fall of arterial pressure, have a lymphagogic action, and other effects usually attributed to proteoses. Pick and Spiro had attributed the action on the blood-coagulation not to pure proteose, but to an impurity ("peptozyme").

Bulawinzew⁹ makes an important contribution to the subject of the

¹ Hofmeister's Beitr., 4, 59.

² Jour. of Hygiene, 3, 258.

³ Deut. med. Woch., 29, 192.

⁴ Boston M. and S. Jour., 148, No. 2.

⁵ Wien. klin. Rundschau, 1903, No. 1.

⁶ Deut. med. Woch., 29 (ii), 37.

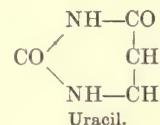
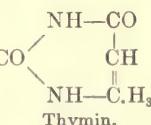
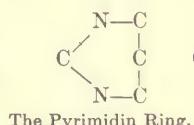
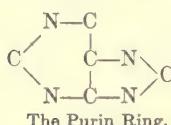
⁷ Zeit. f. physiol. Chem., 37, 81.

⁸ Am. Jour. Physiol., 8, xvi; Underhill, ibid., 9, 345.

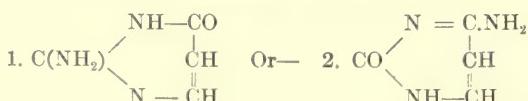
⁹ Abstr. (from the Russian) in Biochem. Centralbl., 1, 593.

psychic gastric juice of man. The gastric juice excreted under the influence of stimulation of the appetite through taste, sight, and hearing was found to have great activity; the degree of the latter depended on the extent to which the former was stimulated. This observation is another illustration of the fact that it is not a matter of indifference whether food is taken in the ordinary way or artificially.

Pyrimidin Derivatives.—In the year 1894 Kossel and Neumann showed that on hydrolysis of the nucleic acid from the thymus of the calf two crystalline substances could be obtained which were at the time unknown to physiologic chemistry. One of these, called thymin, was subsequently shown by Kossel and Steudel to be methyldioxypyrimidin, thus proving the existence, in the nucleic acids, of a ring closely related to the purin ring, which is the nucleus upon which uric acid and all of the xanthin bases are constructed.



Aescoli found later that the nucleic acid of yeast yields no thymin, but a simpler pyrimidin derivative called uracil; and subsequent work by Kossel, Gulewitch, Levene, Jones and Whipple, Osborne and Harris showed collectively that one or the other of these two pyrimidin derivatives is to be obtained on hydrolysis of any of a large number of nucleic acids. Finally, Kossel and Steudel¹ obtain uracil from thymus nucleic acid and from the nucleic acid of fish spermatozoa. The discovery of so simple a pyrimidin derivative as uracil must give our conception of the origin of uric acid and the purin bases a new direction. The relation of uracil to uric acid is so close that we can scarcely escape the assumption that the one compound is the precursor of the others. The second of Kossel and Neumann's crystalline products from thymus nucleic acid was called cytosin, and from a very unsatisfactory analysis the author adopted provisionally the formula $\text{C}_{21}\text{H}_{30}\text{N}_{16}\text{O}_4$, but Kossel and Steudel² are able to obtain the same substance from the nucleic acid of the herring testicle, which gives analytical numbers that are in perfect accord with the simple formula $\text{C}_4\text{H}_5\text{N}_3\text{O}$. The substance responds to the Weidel chlorin reaction, and by treatment with nitrous acid is converted into uracil. The reaction is the same as that by which guanin can be converted into xanthin and adenin into hypoxanthin, and the relation between the numbers of each pair of substances is the same. Uracil must therefore be a derivative of pyrimidin, and its constitution can only be represented by one of two formulas:

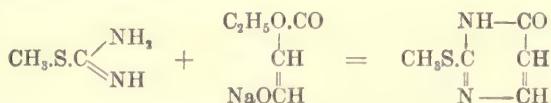


¹ Zeit. f. physiol. Chem., 37, 245.

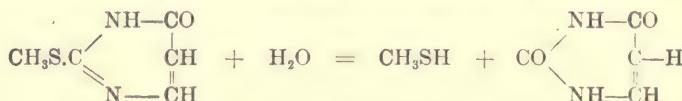
² Zeit. f. physiol. Chem., 38, 49.

We would expect a substance having formula (1) to yield derivatives of guanidin, $\text{C}(\text{NH})\text{NH}_2$, while one having formula (2) would yield derivatives of urea, CONH_2 . Kossel and Steudel¹ obtain biuret (a derivative of urea, not of guanidin) by oxidizing cytosin with barium permanganate, and the compound can therefore be no other than 6-amido-2-oxypyrimidin.

Shortly after the discovery of **uracil** and **thymin**, as decomposition-products of nucleic acids, Fischer and Roeder² succeeded in preparing them synthetically. Later Wheeler and Merriam³ found that pseudo-thioureas may be condensed with various ethers in the cold, giving corresponding mercaptopyrimidin compounds which easily lose mercaptan on simply heating with hydrobromic acid and pass into sulfur-free pyrimidin derivatives. The synthesis is an excellent one and can be utilized for the synthetic preparation of both thymin and uracil. Wheeler and Merriam succeeded in condensing methylpseudothiourea with the sodium salt of formylacetic ether, thus:

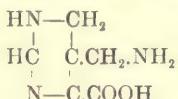


This compound loses methylmercaptan and forms uracil, thus:



The product formed was found identical with the uracil of Fischer and Roeder, and therefore also with that obtained from nucleic acids. By a perfectly analogous reaction thymin was obtained. This preparation was compared with a specimen of thymin which P. A. Levene had obtained by hydrolysis of the nucleic acid of the spleen. The two were found identical in all respects, the melting-point of a mixture of the two specimens being the same as that of either specimen.

Histidin, according to S. Fränkel,⁴ is an α -amido-carbonic acid and should not be classed with arginin and lysin. The formula is proposed:



The nucleus $\text{C}_5\text{H}_8\text{N}_2$ is called histin; it is a methyldihydropyrimidin.

Hardy⁵ discusses the **action of radium salts on globulin**. Among the results was the observation that an electronegative (alkaline) solution was turned into a jelly, at first transparent, then opaque, in about 3 minutes; whereas with an electropositive (acid) solution the opalescence

¹ Fischer and Roeder, Ber. d. d. chem. Ges., 34, 3751.

² Ber. d. d. chem. Ges., 34, 3751 (1901).

³ Am. Chem. Jour., 29, 478 (1903).

⁴ Monatsh. f. Chem., 24, 229.

⁵ Jour. Physiol., 29, xxix.

disappeared, indicating a more complete solution. The globulin was exposed as naked drops separated by 3 mm. of air from 50 mg. of radium bromid. The various kinds of emanations from radium are discussed in connection with this action.

The influence of radium on the growth of animal tissues is the subject of a short communication by Bohn.¹ The experiments were made on the embryos of frogs and toads, and it was found that the rays emitted by radium lessened the growth of the tissues or rendered the growth very irregular.

Pfeiffer and Friedberger² find that radium rays have a bactericidal action. Experiments were made with typhoid, cholera, and anthrax cultures. Anthrax spores were killed in 72 hours by the emanations of 25 mg. of radium bromid at a distance of 1 cm. The culture-medium itself was not altered.

P. Fränckel³ finds the reaction of the blood, as determined by physical chemic methods, to be neutral or very feebly acid, this reaction being caused by the CO₂. Höber, by the use of a similar (but, according to Fränckel, a faulty) method, had reached the conclusion that the reaction is feebly alkaline. Friedenthal,⁴ by the use of indicators sensitive to CO₂, had already reached the same conclusion as Fränckel.

Edsall and Miller⁵ report an interesting study on rectal absorption in 2 cases nourished exclusively by the rectum. Considerable amounts of nitrogen and of fat were absorbed, but only a small fraction of that necessary to maintain a nutritive equilibrium, and both cases lost much nitrogen and emaciated rapidly. In the case in which absorption seemed to be the best the ethereal sulfates of the urine were extremely high. This indicates that a considerable part of what seemed to be absorption was merely bacterial decomposition.

Enriquez and Hallian⁶ publish two short communications on secretin. The results confirm, in general, the work of Bayliss and Starling. They find that intraduodenal injection also causes a flow of bile. The "acid reflex of Pawlow" is due largely to the fact that acids cause a formation of secretin which acts directly upon the pancreas; the nervous reflex is much less important. Bayliss and Starling⁷ make a second contribution to this subject. They consider secretin to be a simple substance of definite chemic constitution, and that it is common to all types of vertebrate animals and is not specific for each type. The direct action of secretin is limited to the pancreas. They only obtained secretin by extracting, with acid, the upper part of the small intestine and from no other part of the body. Secretin, according to Mendel and Thacher,⁸ produces an increased flow of lymph from the thoracic duct which is independent of alterations in general blood-pressure. There was an increase in the solids of the lymph. The action of secretin is also discussed by Fleig.⁹

¹ Compt. rend., 136, 1012.

² Berl. klin. Woch., 1903, No. 28.

³ Pflüger's Archiv, 96, 601.

⁴ Zeit. f. allg. Physiol., 1, 56.

⁵ Univ. of Pa. Med. Bull., Jan., 1903.

⁶ C. R. Soc. Biol., 55, 233, 363.

⁷ Jour. Physiol., 29, 174.

⁸ Am. Jour. Physiol., 9, xv.

⁹ Compt. rend., p. 464.

A new base, **skatosine**, has been isolated by Baum¹ from the products of pancreatic autodigestion. It was found to have the composition $C_{10}H_{16}N_2O_2$. On fusing with alkali a strong skatol-like odor was produced. The base is precipitable by phosphotungstic acid and yields a yellow precipitate with bromin water. Swaine² found that skatosine can be obtained as a decomposition-product of other proteids. It is not identical with tryptophan and contains two amido and two hydroxyl groups.

J. H. Lang³ has a communication on the **relation of the specific gravity to the solids of the urine**. The percentage of the latter may generally be calculated with sufficient accuracy from a careful determination of the former. A new factor is proposed: 0.26 when the specific gravity is taken at 25° and 0.234 when it is taken at 20°. Attention is called to the difficulty of determining, analytically, the solids of the urine, because it is not known how the ammonia which escapes should be reckoned. This ammonia does not come entirely from the urea. Donzé⁴ multiplies the figures above 1000 of the specific gravity by 2.2 to obtain, approximately, the amount of solid matter per liter.

The chemistry of the sputum in a number of diseases is discussed by Wanner.⁵ As much as 3 % of proteid was found in pneumonia, while in phthisis and bronchiectasis the amount of proteid never exceeded 1 %. Several other points, some of value in diagnosis, are discussed.

Suprarenal.—As is well known, the preparation called adrenalin was independently isolated by both Aldrich and Takamine, the former assigning the formula $C_9H_{13}NO_3$ and the latter the formula $C_{10}H_{15}NO_3$. The great difference in the carbon found by both chemists from that required by the formulas assigned is sufficient to rule out both formulas. The case, moreover, is such that no rational formula is deducible from the analytic data given, a sure indication that adrenalin as hitherto isolated is a mixture and not a chemic individual. As it is desirable to establish the relation between epinephrin and adrenalin, Abel⁶ has attempted to purify and analyze the latter. He describes a method, based primarily on the extraction of the glands with an alcoholic solution of trichlor-acetic acid, and a subsequent purification which produces a product which is entirely ash-free and, as will be shown, is a chemic individual. The product obtained, especially when precipitated slowly, consists of aggregates of well-formed prisms terminated sharply by pyramidal planes. Abel does not note the "boat shape" nor the "tomato shape" described by Takamine. By the use of this method Abel succeeded in obtaining 35.36 grams of crude adrenalin from 11 kgm. of moist gland. The materials involved, moreover, are not expensive; so that we would say roughly this method in the hands of an economic manufacturer should reduce the present price of adrenalin (65 cents a grain) to about 5 cents a grain, and at the same time furnish a product perfectly pure. By analysis of various specimens obtained by this method Abel is led

¹ Hofmeister's Beitr., 3, 439. ² Ibid., 442. ³ Jour. Am. Chem. Soc., 25, 257.

⁴ C. R. Soc. Biol., 55, 537.

⁵ Deut. Arch. f. klin. Med., 77, 347.

⁶ Am. Jour. Pharm., July, 1903, p. 301. See also Ber. d. d. chem. Ges., 36, 1839.

sharply to the formula $C_{10}H_{13}NO_3 \cdot \frac{1}{2}H_2O$. A specimen of this pure substance was dissolved in concentrated sulfuric acid and the acid solution poured carefully into absolute alcohol, when a white precipitate fell out, which was carefully dried with alcohol and ether. This substance has alkaloidal properties, and is in every respect indistinguishable from the sulfate of what Abel has hitherto described as epinephrin. Its analysis leads sharply to the formula $(C_{10}H_{13}NO_3)_2 \cdot H_2SO_4$. We have, therefore, chemic evidence of the very highest order that "epinephrin" and the essential chemic principle of "adrenalin" differ from one another by a half molecule of water, or that adrenalin is simply "epinephrin hydrate." Von Fürth originally took the ground that epinephrin is an alkaloidal constituent of the gland which owes its physiologic activity to its contamination with "suprarenin," and Aldrich stated that as "adrenalin" will reduce Fehling's fluid, epinephrin and other substances not having this property have nothing to do with the physiologically active principle. In view of the quantitative transformation of adrenalin into epinephrin, these statements are both amusing and instructive. Abel deals also with the action of both epinephrin and adrenalin on Fehling's solution and states that neither will throw down cuprous oxid immediately, but both will do so on long-continued boiling. The difference previously noted is, therefore, simply a difference in understanding what is usually meant by boiling with Fehling's fluid; *i. e.*, whether the fluid is supposed to be heated until it boils or the boiling continued for several minutes.

According to Bernard and Lobbé,¹ the large amount of lecithin found in the suprarenals of different animals justifies the conclusion that these organs secrete or make **lecithin**. Moulon² states that lecithin is a variable but important constituent of certain fatty particles seen in the guineapig's suprarenal.

Croftan³ reports experiments on the **urinary calcium excretion in tuberculosis**. Special attention was given to a calcium compound of deutoalbumose. When this was injected into tuberculous cattle no "tuberculin reaction" occurred, whereas such a reaction resulted from the injection of the decalcified deutoalbumose. The author thinks such a calcium compound is formed in tuberculosis and that it serves to protect the patient against the deutoalbumose. It had been shown that deutoalbumose occurs in tubercle bacilli, and also that deutoalbumose causes a "tuberculin reaction." The author finds an abnormally high calcium excretion even in early tuberculosis.

O. Simon⁴ found that the **albumoses of tuberculous sputum** caused a rise of temperature when injected into guineapigs. The reaction was much more marked with tuberculous animals. It is suggested that a connection exists between the albumoses and the fever of tuberculosis.

E. A. De Schweinitz and Dorset⁵ have made experiments on the **composition of tubercle bacilli derived from various animals**. One of the most interesting results was the observation that virulent human,

¹ C. R. Soc. Biol., 55, 120. ² Ibid., 82. ³ Jour. of Tuberculosis, Jan., 1903.
⁴ Arch. f. exp. Path. u. Pharmak., 49, 449. ⁵ Amer. Med., July 19, 1902.

bovine, horse, and swine bacilli contain less matter soluble in ether than do nonvirulent human bacilli; thus the virulent human bacilli gave 20.31 parts of ether extract, the attenuated 28.72 parts. It is suggested that the latter produce greater amounts of poisonous proteids.

The **fat of tubercle bacilli** has been investigated by Kresling.¹ Fat was found to be present to the extent of 38.95 % of the dry substance obtained in the preparation of tuberculin. The fatty substance extracted by chloroform melted at 46° and contained 14.38 % of fatty acids.

Mörner² reports numerous careful experiments on the **determination of urea** in human urine. He recommends treating the urine with barium hydroxid and alcohol-ether and then decomposing the urea by Folin's method (heating with magnesium chlorid and hydrochloric acid). The author emphasizes an error which may occur in urea determination,—viz., sugar may form, on treatment with acids, humin substances which will take up some of the nitrogen; this error is avoided in the above method.

Jolles' contention that he obtained **urea** by the oxidation of proteids outside of the body was strongly disputed by Schultz. Abderhalden³ is also unable to verify Jolles' work.

Chittenden and Beebe⁴ find that pure **alcohol diluted with water** caused a **decreased excretion of uric acid** if given to men while fasting; given with meals, the uric-acid excretion was increased. The authors conclude that the effect is due to a disturbance in the metabolism of the purin bases of the food. The same quantity of alcohol contained in beer or urine produces a more marked effect.

Taltavall and Gies⁵ confirm the work of Huffer that **quinic acid** does not materially affect the uric-acid output in dogs.

The **injurious effect** upon dogs of an **exclusive horse-meat diet** was pointed out by Pflüger. Kochman⁶ finds that an exclusive meat diet (beef, etc., as well as horse-flesh) causes, in dogs, subacute nephritis, cloudy swelling of the liver, and deposition of pigment in the liver. These results are attributed to increased formation of uric acid; the bearing of these facts on gout is pointed out.

Schlesinger⁷ recommends the following **test for urobilin** in the urine: Equal parts of the urine and a 10 % solution of zinc acetate in absolute alcohol are mixed and then filtered; if urobilin is present the filtrate shows a beautiful fluorescence with distinct absorption bands. Other pigments in the urine do not disturb the reaction, except bilirubin in large quantity. It is not easy to apply the method to the blood.

Braunstein⁸ believes that **urobilin is found in the stomach** only when bile containing urobilin has entered the stomach. Meinel had stated that it could originate in the stomach itself under certain conditions.

Braunstein⁹ finds that in carcinoma **urobilin** appears in the urine in

¹ Arch. Soc. biol. St. Petersb., 9, 359.

² Skand. Arch. f. Physiol., 14, 297.

³ Zeit. f. physiol. Chem., 37, 506.

⁴ Am. Jour. of Physiol., 9, xi.

⁵ Ibid., 9, xvi.

⁶ Pflüger's Arch., 94, 593.

⁷ Deut. med. Woch., 29, 561.

⁸ Zeit. f. klin. Med., 50, 1 and 2.

⁹ Zeit. f. Krebsforschung, 1, 15.

considerable amounts only when the liver itself is involved, as when there are complications (fever, pneumonia, putrefaction). In **carcinoma of the liver** the urobilin disappears from the urine when the bile-duet is occluded while the increased excretion of bilirubin continues.

Desmoulière and Gautrelet¹ state the **yellow pigment of cows' milk**, which is usually described as a lipochrome, is almost entirely urobilin.

¹ C. R. Soc. Biol., 55, 632.

INDEX.

- ABBOTT (A. C.) on adrenal gland and its active principle in relation to cytolysins and antitoxin-production, 334.
Abbott (S. W.) on wood alcohol, 552.
Abbott and Bergey on influence of alcoholic intoxication on hemolysis, 330.
Abbott and Gildersleeve on proteolytic enzymes, 333.
Abdominal muscles, spasm of, 193.
Abel on adrenalin, 631.
Abortion, criminal, 538.
Abrams (A.) on bronchial phthisis, 35.
Abscess, mammary, in typhoid fever, 18; of brain, 397; of liver after typhoid fever, 361; bacteria in, 361; of lung after pneumonia, 60; subcutaneous, in child, due to gonococcus, 293.
Absorption, influence of nephrectomy upon, 365; of fat, 516; of fat, action of drugs on, 516; of iron, 516; physiology, 516; rectal, 630; relation of lymphatic apparatus of intestine to, 517.
Abt (I. A.) on typhoid fever in children, 249; on gelatin in children, 486; on rickets, 286; on spontaneous hemorrhage, 280.
Accidents and injuries, death from, 533.
Acetanilid, 462; poisoning, 120, 462.
Acetonemia, vomiting with, 266.
Acetonuria, 98; in typhoid fever, 14.
Acetozone, 462; in typhoid, 23, 462.
Acetyl salicylic acid, 473.
Achilles jerk, 378.
Acholia, 205.
Achondroplasia, 286, 288.
Achyilia gastrica, absence of ferments in, 178; and pernicious anemia, relation between, 131.
Acid intoxication in children, 266.
Acidity of urine, 601.
Acker on essential dropsy, 272.
Aene vulgaris, etiology, 422; x-rays in, 422.
Aconite poisoning, criminal, 545.
Actinomycosis of central nervous system, 369; primary, of lung, 355; primary, of occiput, 423.
Adams-Stokes symptom-complex, 155.
Addison's disease, suprarenal extract in, 45.
Adelman (L.) on criminal aspect of negro, 562.
Adenin in gout, deposits from, 102.
Adenocarcinoma, primary, of thyroid, 388.
Adenoids, pathology and bacteriology, 357.
Adenoma, benign, of stomach, 186; of liver, 361.
Adipose tissue, formation of hemolymph glands from, 341.
Adiposis dolorosa, 406; pathology, 372.
Adler (H.) on pernicious anemia and achylia gastrica, 131.
Adrenal, ectopia of, 350; gland and its active principle in their relations to cytolysins and antitoxin-production, 334.
Adrenalin, 462; and epinephrin, relation between, 632; as hemostatic, 464; glycosuria, 520; in heart-failure, 463, 464; in hemorrhage, 464; in shock, 464; physiologic chemistry, 631.
Ager on infant mortality, 242.
Agglutination and pathogenicity of *Bacillus subtilis*, 335; of streptococci, 84.
Agglutinins acting on flagellums and bacteria, nonidentity of, 333; immunization, in cold-blooded animals, 328.
Agraphia, brain center for, 400.
Agrurin, 465; in diseases of kidneys, 232.
Air, compressed, 480; compressed and rarefied, 512; hot, in lupus, 434; hot, in rheumatism, 68; sterilized, in pleurisy, 169.
Akromegaly, 111, 406; chemical pathology, 111.
Albinism among Melanesians and Polynesians, 429.
Albumin in urine, origin, 365; volumetric determination, 601.
Albumin-digesting power of stomach-contents, 174.
Albuminous expectoration after thoracocentesis, 169; substances, optical activity, 623.
Albuminuria, 221; alimentary, 223; cyclic, 221; cyclic, in children, 292; in erysipelas, 224; minimal, 221; traumatic, 223; volumetric estimation of, 228.
Albumoses and peptone precipitins, formation of, 627; of tuberculous sputum, 632.
Albumosuria, 220; Bence-Jones, multi-

- ple myeloma with, 220; of pernicious anemia type, 221.
- Alcohol, 465; action of, on secretion of gastric juice, 513; and life insurance, 590; effect of, on bacteriolytic power of blood, 466; effect of, on digestion, 465; effect of, on metabolism, 465; effect of, on uric acid, 633; germicidal action, 331, 466; in heart disease, 156; influence of, on proteid metabolism, 621; metabolism, 523; methyl, toxicity of, 551; precipitability of pancreatic ferments by, 614; wood, effects produced by, 552; wood, sale of, medicolegal aspects, 552.
- Alcoholic ancestors, predispositions of children with, 294; intoxication, influence of, on hemolysis, 330; poisoning, acute, 551.
- Alcoholism, chronic, central nervous system in, changes in, 383; in relation to glycosuria and diabetes mellitus, 92.
- Aldehyd, isocamphanilic, 615.
- Aldrich (C.) on paralysis and damage suits, 539.
- Aldrich (C. J.) on angina Ludovici, 264; on polyneuritis, 259.
- Alimentary tract in child, diseases of, 264.
- Alkaline iodids, absorption of, from stomach, 175.
- Alkalinity of blood, determining, 115.
- Allbutt (T. C.) on gastric dilation, 181.
- Allen (C. W.) on skin cancer, 440.
- Allen (H. W.) on albuminous expectoration after thoracocentesis, 169; on paracolon infection, 26.
- Allen and Russell on rheumatic hyperpyrexia, 66.
- Allison and Moore on malaria, 55; on methylene-blue, 492.
- Alloxur bodies, 103; and pathology of gout, 373.
- Alopecia areata, trikresol in, 429; x-ray in, 429; cause and pathology, 429.
- Altitude, effect of, on blood, 118; high, respiration in, 164.
- Amaurotic family idiocy, 412.
- Amebic dysentery, 196.
- Amidoacids, 601.
- Ammonia, estimation of, in organic fluid, 607.
- Ammonium compounds, toxicology of, 548; ion, toxicology of, 548.
- Amniotic liquid, enzymes in, 612.
- Amphophile leukocytogenesis in rabbit, 344.
- Amrein on hetol in tuberculosis, 45.
- Amygdalitis in children, 264; acute appendicitis after, 269.
- Amyloid degeneration in stomach, 188.
- Amyotrophy, articular, 382.
- Anasarca, chronic, puncture of lower extremities in, 157.
- Anders (H. S.) on influenza, 73.
- Anders (J. M.) on tuberculosis of myocardium, 34.
- Anderson and Langley on regeneration of nerve-fibers, 527.
- Andrews and Wall on chorea of pregnancy, 403.
- Anemia, Biermer's, and pernicious anemia, differentiation, 129; changes in blood-building organs in, 116; from hemorrhages, 119; from uncinaria duodenalis, 236; in childhood, causes, 279; in Cuba, relation of uncinaria to, 236; iron in, effect of, 128; lead, blood-changes in, 345; obscure, observations on, 116; pernicious, 128 (see also *Pernicious anemia*); plasmatic, 117; secondary, 119; splenic, 138; splenic, acute, 139; splenic, erythromelalgia complicating, 138; splenic, in children, 281; splenic, with diffuse productive nephritis, 358.
- Anemic blood, ring bodies in, 340; infarcts, multiple, of liver, 359; spinal cord, conduction in, 380.
- Anesthesia, 466.
- Anesthetic, ether as, 482; ethyl bromid as, 483; ethyl chlorid as, 483; somnoform as, 497.
- Aneurysm, 158; aortic, gelatin in, 160, 487; aortic, symptoms, 159; aortic, with transverse position of heart, 160; disappearance of groove above left clavicle as symptom, 159; of heart, 151; thoracic, inequality of pupils in, 158.
- Aneurysmal dilation of ductus arteriosus, 351.
- Aneurysms, two, in single heart, 352.
- Angina Ludovici in children, 264; pectoris, 156; pectoris, nature, causes, 156; pseudomembranous, 254; ulcerating membranous forms of, in children, 264.
- Angiodermatitis, tuberculous, of hands, 431.
- Angioma of liver, 361; of skin, relation of, to malignant disease, 436.
- Angioneurotic edema and myasthenia gravis, 381; erythema, 405.
- Angiosarcoma in children, 302.
- Anilin metarsenite, toxicology, 552.
- Animal heat, 525.
- Ankylostomiasis, 236, 327; with symptoms of pellagra, 235.
- Anopheles, structure and biology, 581.
- Anthony (H. G.) on dermatitis verrucosa, 435; on relaton of lupus erythematosus to tuberculosis, 430.
- Anthracosis and tuberculosis in coal-miners, 31.
- Anthrax, enzyme of, 612.
- Antiferments, 515.
- Antimorphin serum, 467.
- Antipepsin, 612.
- Antiplague serum, 467.
- Antipneumococcus serum, 468.

- Antipyrin, 468.
 Antiscarlatinal serum, 468.
 Antiseptic, poisoning by, 557.
 Antistaphylococcus serum, 468.
 Antistreptococcus serum, 468; active substances of, 609; in infective endocarditis, 149; in malignant endocarditis, 469; in tuberculosis, 469.
 Antitoxin, diphtheria, in bronchopneumonia in children, 274; hay-fever, 487; in laryngeal diphtheria, 256; of diphtheria, 254, 469; of diphtheria in bronchopneumonia, 470; tetanus, 498.
 Antitoxin-production and cytolysin, adrenal gland and its active principle in relations to, 334.
 Antitrypsin of blood, 612.
 Antitryptic action of blood, 612.
 Antityphoid serum, 471.
 Antrum of Highmore and larynx, changes in, 134.
 Anus, fissures of, pruritus and, 442.
 Aorta, bifurcation of, embolism of, 161; rupture of, 158.
 Aortic aneurysm, gelatin in, 160, 487; aneurysm, symptoms, 159; aneurysm with transverse position of heart, 160; regurgitation, musical murmur in, 149.
 Aphasia, uremic, 230.
 Apiosoma in typhus fever, 81.
 Apocodein, 471.
 Apocynum cannabinum, 472; in dropsy, 208.
 Apoplectic attacks, Babinski symptom in, 394.
 Appendicitis, 197; acute, after amygdalitis in child, 269; acute, from *Oxyuris vermicularis*, 236; leukocytosis in, 198; lobar pneumonia in child simulating, 273.
 Appendix, vermiciform, hyperplastic tuberculosis of, 358.
 Argenin, 603.
 Argyrol, 472; in gonorrhea, 472.
 Aristochin in whooping-cough, 260.
 Aristoquinin, 472; in whooping-cough, 472.
 Arms, paralysis of, medicolegal tests in, 567.
 Arrhenal in chlorosis, 128; in malaria, 56; in plague, 76.
 Arsenic, 473; action of, on bone-marrow, 347; and iron, relative effect of, 491; in body, 607; in chorea, 473; in hen's egg, 608; in living organisms, 553, 595; in sea-sand, 553.
 Arsenical neuritis, hemoglobin in, 552; poisoning, ferric hydroxid in, 552.
 Arteries, diseases of, 157; median coat, calcification of, 353.
 Arteriosclerosis, 157, 353; gastrointestinal disturbances in, 157; Trunecek's serum in, 158.
- Arthritis, acute rheumatoid, pathology, 317; deformans, 108; deformans in children, 284; etiology, 64; pneumococcic, 62, 63; pneumococcic, 319; rheumatoid, and exophthalmic goiter, relation between, 110; rheumatoid and tetany, relation between, 110; rheumatoid, Graves's disease with, 404; rheumatoid, reflexes in, 108; rheumatoid, vasomotor and ocular phenomena in, 110.
 Articular amyotrophy, 382.
 Ascarides in child, suffocation by, 265.
 Aschoff (L.) on albumin of urine, 365.
 Ascites, chronic obliterative pericarditis associated with, 145; chylous, 214; milky, lecithin as causing, 214.
 Ascitic fluid, mucin in, 622.
 Ash constituents, determination of, 619.
 Ashurst on gastric ulcer, 186.
 Aspidium, 473.
 Aspiration, sweeping or dusting by, 600.
 Aspirin, 473; in diabetes mellitus, 99, 100, 473; in glycosuria, 99, 100; in rheumatism, 474.
 Asses' milk, 243.
 Asthma, 164; atropin in, 165; in children, 273.
 Ataxia, cerebellar, 528; locomotor, 385. See also *Locomotor ataxia*.
 Atmospheric impurity, carbonic acid test as index of, 599.
 Atrophy, acute yellow, of liver, liver in, 360; general, in children, 284; muscular, in tabes, 385.
 Atropin, 474; in asthma, 165; in spasmodic torticollis, 474.
 Atwater and Benedict on alcohol metabolism, 524.
 Atwell (J. R.) on carbolic acid poisoning, 558.
 Auld (A. G.) on tuberculosis, 36.
 Aura, sensory, of epilepsy, 410.
 Autolysis, 516; in lobar and unresolved pneumonia, 354; of leukemic spleen, products of, 620; of lymph-glands, products of, 620.
- BABCOCK on pleurisy, 33.
 Babinski phenomenon, 379; symptom in apoplectic attacks, 394.
 Baccelli treatment of tetanus, 478.
 Bacilluria, typhoid, 17, 18.
 Bacillus, acid-fast, in tuberculosis, 39; aerogenes capsulatus in blood, 85; chancroid, 321; colon, in drinking water, 320; colon, infection and sub-infection by, 319; diphtheria, distribution of, 575; diphtheria, serum for dissolving, 257; enteritidis, continued fever due to, 26, 321; Friedländer's, infection with, 85; of dysentery, experimental vaccination against, 311; of dysentery in infantile diarrhea,

- 310; of dysentery, Shiga, and serum reactions in epidemic dysentery, 310; of Hofmann, distribution, 575; of syphilis, 453; of tuberculosis, 306 (see also *Tubercle bacillus*); of whooping-cough, 259; testis in plague, serum reaction of, 335; pseudotubercle, in man, 306; subtilis, agglutination and pathogenicity of, 335; typhoid, 14 (see also *Typhoid bacillus*).
 Bacteria and flagella, agglutinins acting on, nonidentity of, 333; branching, 323; effect of urotropin on, 502; in abscess of liver, 361; in feces, 191; in pneumonia, 57; in river-water, 593; intestinal, in nutrition, 190; pathogenic, in water, ozone in destruction of, 591; pathogenic, intracellular toxins of, 619; pathogenic, vitality of, 575; water, reaction of, with dysentery, immune serum, 310.
 Bacteriology and pathology, 429.
 Bain (W.) on piperidin tartrate, 494.
 Bake-houses, ventilation of, 585.
 Baker (C. J.) on trypanosoma in man, 238.
 Baker (P. S.) on empyemas in children, 276.
 Balantidium, 239; coli, pathogenicity, 239.
 Baldness, cause and pathology, 429.
 Baldwin (F. A.) on multiple anemic infarcts of liver, 359.
 Ballance on facial paralysis, 392.
 Ballance and Stewart on facial paralysis, 392.
 Ballenger on mouth-breathing, 273.
 Balsam of Peru in tuberculous cutaneous ulcers, 436.
 Bank-notes, bacteriology of, 576.
 Barber on multiple ulcers of stomach in child, 266.
 Barbour on capillary bronchitis, 274.
 Bardswell and Chapman on pulmonary tuberculosis, 44.
 Barium chlorid, 474.
 Barnard on simulation of acute peritonitis, 163.
 Barnes and Eckles on purification of milk, 590.
 Barr (J.) on Banti's disease, 138.
 Barratt and Harley on gallstones placed in gallbladder, 614.
 Barret on exophthalmic goiter, 404.
 Barrett and Ensor on paroxysmal hemoglobinuria, 219.
 Barrows on formalin in streptococcus infection, 484.
 Basedow's disease, 105, 404. See also *Exophthalmic goiter*.
 Baskett (B.) on antityphoid serum, 23.
 Batson (T. D.) on strichnin poisoning, 550.
 Batten on acute poliomyelitis and encephalitis, 296; cerebellar disease, 402; polioencephalitis inferior, 370.
 Baumann on relative effect of iron and arsenic, 491.
 Bayet (A.) on chrysophanic acid in psoriasis, 419.
 Bayliss and Starling on enterokinase and trypsin, 515; on secretin, 514, 630.
 Beaton and Walker on acute rheumatism, 317.
 Beattie on hemochromatosis and diabetes mellitus, 362.
 Beebe and Chittenden on effect of alcohol on uric acid, 633.
 Bence-Jones albumosuria, methods of determining, 220; multiple myeloma with, 220.
 Belladonna, poisoning by, 546.
 Benedict on filtration of stomach-contents, 173.
 Benedict and Atwater on alcohol metabolism, 524.
 Bennett and Patek on differentiating human blood, 334, 564.
 Berg (H. W.) on pulmonary syphilis, 166.
 Bergey (D. H.) on reaction of water bacteria with dysentery immune-serum, 310.
 Bergey and Abbott on influence of alcoholic intoxication on hemolysis, 330.
 Bertillon method of identification, 564.
 Bey and Ruffer on cholera, 77.
 Biermer's anemia and pernicious anemia, differentiation, 129.
 Bigg on cost of tuberculosis, 572.
 Bile-duct, common, dilation of, 212.
 Bile-passages and bronchus, fistula between, 211; diseases of, 209.
 Bile-pigments in blood, 202; Huppert's test for, modification of, 203, 608.
 Bilharzia haematoxia in Cyprus, 237; infection in West Indies, 237.
 Biliary passages, carcinoma of, pathology, 362.
 Billings (F.) on changes in spinal cord and medulla in pernicious anemia, 131.
 Billings (J. S.) on diazo reaction in typhoid fever, 21.
 Billings (J. S., Jr.) on Widal's reaction, 20.
 Bismuth, 475; in gastric ulcer, 187; tribromphenol, 504.
 Bismutose, 475; in gastric ulcer and hyperacidity of stomach, 187.
 Biuret, 629.
 Black (W. C.) on pruritus and fissures of anus, 442.
 Blackader (A. D.) on typhoid in children, 249.
 Blackmore (G. J.) on plague, 75.
 Blackwater fever, 51; cassia beareana in, 56; from Philippines, 50.

- Bladder, effect of chloroform on, 519; permeability of, 519.
- Blastomycosis of skin, 427; from accidental inoculation, 435.
- Bleeding, blood-changes after, 346.
- Blood, alkalinity of, determining, 115; alterations in, in acetanilid poisoning, 120; anemic, ring bodies in, 340; antiserum method of differentiating, from other blood, 334; antitrypsin of, 612; antitryptic action of, 515, 612; *Bacillus aerogenes capsulatus* in, 85; bactericidal effect of, on certain species of pathogenic microorganisms, 334; bacteriology, 340; bacteriolytic power of, effect of alcohol on, 466; bile-pigment in, 202; biologic test for, 627; coagulation of, 506; detection of, preserving anti-serum for, 566, 567; differentiation of, from other blood, antiserum method, 564; diseases of, 115; diseases of, in children, 279; Eberth's bacillus in, in typhoid fever, 574; effect of altitude on, 118; effect of fasting on, 118; effect of lymphotoxins and myelotoxins on, 331; effect of sweating on, 117; electric conductivity of, 614; examination of, bacteriologic, in scarlet fever, 318; examination of, by hematocrit, 115; examination of, in cholera, 77; examination of, methods, 115; freezing-point of, influences of removal of liver on, 203, 335; glycolysis in, 89; in chlorosis, chemical condition of, 127; in diabetes mellitus, 94; in epilepsy, 408; in filariasis, 327; in scarlet fever, 251; in syphilis, 454; in ticks after sucking, 119; in tuberculosis, 32; in typhoid fever of children, 250; in ulcerous and gummosus syphilis, 453; iron in, determining, 116; leukocytes in, in children, 279; lymphoid cells in production of, 132; method of demonstrating presence, 115; methods of examination, 115; of cold-blooded animals, interaction of, 329; of rabbits, hemolytic complement in, 329; pathology, 340; phosphorous in, determining, 116; physiology, 506; poverty of, in scurvy, 137; reaction of, 508, 630; reaction of, in experimental diabetes mellitus, 335; serum-diagnosis of nature, 120; trypanosome in, 238; viscosity of, 118.
- Blood-cells, origin of, 133.
- Blood-changes after bleeding, 346; in lead anemia, 345.
- Blood-corpuscles, effect of massage on, 118.
- Blood-flow, physiology, 511.
- Blood-forming apparatus, relations of slight infections to, 346.
- Bloodgood (J. C.) on angioneurotic erythema, 405.
- Blood-plates in syphilitic subjects, 123.
- Blood-pressure, 140; heroin as reducing, 142; in children, 280; in exophthalmic goiter, 106; in various conditions, 140; influence of hyperisotonic and hypotonic mineral-water upon, 141; method of determining, 140; splanchnic nerve in determining, 141.
- Blood-serum, hemolytic power of, change of, 333; in insanity, 413; in smallpox, 312, 313; lipolytic action, 612; normal, plurality of cytolsins in, 328; saponifying action, 613.
- Blood-stains, medicolegal tests of, 564; origin of, diagnosis, 564.
- Bloodvessels and heart in children, diseases of, 277; behavior of, after section of their nervi vasorum, 351.
- Blue toes, 442.
- Blumenthal on anilin metarsenite, 552.
- Boas on carcinoma and diabetes, 90.
- Bone, tumors of, with thyroïdal structure, 337.
- Bone-marrow, action of arsenic on, 347; living, method of studying, 124.
- Bones, fragility of, in insane, 412.
- Bonney on antistreptococcus serum in tuberculosis, 469.
- Boot on diarrheas in children, 267.
- Bosanquet on obstruction of inferior vena cava, 351.
- Boston (L. N.) on methods of determining Bence-Jones albumose in urine, 220; on parasitic hematuria, 329.
- Bothriocephalus, 237; latus, pernicious anemia from, 237.
- Botryomycosis in man, 425.
- Boumans on mercuric chlorid poisoning, 560.
- Bovard on empyema in children, 276, 357.
- Bovine and human tuberculosis, relation between, 27, 29, 572.
- Boxmeyer on liver necrosis, 360.
- β -oxybutyric acid in urine, estimation, 624.
- Bradley on reflexograph 378.
- Bradycardia, cardiac, 154.
- Brain, abscess of, 397; cholesteatoma of, 370; emulsion in tetanus, 402; gas-cavities in, 395; hypertrophy of, in children, 295; proper, diseases of, 393; protoplasm of, 608; tumor of, 400; tumor of, surgical treatment, 400.
- Brain-stem, disease of, 396; disease of, thermoanesthesia and thermoanalgesia as symptoms, 396.
- Bramwell on syphilis as cause of death, 454.
- Briggs on respiration in high altitudes, 164.
- Broadbent on Hodgkin's disease, 140.
- Brockman on therapeutic use of x-ray, 447.
- Brodie and Dixon on bronchial muscles, 512.

- Brodie and Siau on phloridzin glycosuria, 519.
 Bromids, 475.
 Bromin in urine, 216.
 Bromoform, 475; poisoning, 475, 544.
 Bromopin, 475; in epilepsy, 475.
 Bronchi and lungs, suppurations of, bacteriology, 356.
 Bronchial breathing, 162; glands, tuberculosis of, 35; muscles, physiology, 512.
 Bronchitis, 164; capillary, in children, 274; fibrinous, causes, 165; fibrinous, pathology, 165.
 Bronchopneumonia, diphtheria antitoxin in, 274, 470; in children, 274; in children, bacteriology, 274; in children, lumbar puncture in, 274; thrombosis of cerebral veins and sinuses with, 352.
 Brooks on nonsuppurative encephalitis, 395.
 Brown (L.) on tuberculous sputum, 41; on weight in tuberculosis, 40; on zomotherapy, 505.
 Brownlee and Thomson on serum in variola, 72.
 Brunton on sodium bicarbonate, 496.
 Brush on foot-and-mouth-disease in children, 263.
 Bryan on iodiform dermatitis, 420.
 Bubonic plague, 75. See also *Plague*.
 Buchanan (T. J.) on x-rays in skin diseases, 439.
 Buchanan (W. T.) on magnesium sulfate in dysentery, 492.
 Bullard on thallium sulfate, 499.
 Bunting on effects of lymphotoxins and myelotoxins on blood, 331.
 Burke on congenital pulmonary stenosis, 150.
 Burnet on ethyl chlorid anesthesia, 483.
 Burr (C. W.) on prefrontal lobes and mental function, 413.
 Butter, dissemination of typhoid bacilli through, 308; effect of, on heart, 510.
 Buttermilk as infant food, 245, 246.
 Butyric acid, effects of, upon intestines, 192.
 Buzzard on Landry's paralysis, 391.
- CABOT (R. C.) on methemoglobinemia, 120; on ring bodies in anemic blood, 340.
 Cabot and Locke on diastolic heart-murmurs, 144.
 Cacodylates, 476.
 Cadaverin from products of hydrolytic decomposition of muscle, 608.
 Cadman on acute plumbism in infant, 303.
 Caie on acute malignant pemphigus, 422.
 Cairns (D. L.) on antitoxin of diph-
- theria, 470; on diphtheria, 256; on Yersin's serum in plague, 76, 467.
 Calcification of median coat of arteries, 353.
 Calcium, action of, on heart, 509; carbonate, 476; chlorid in hemophilia in children, 280; excretion, urinary, in tuberculosis, 632; salts in diabetes mellitus, 100; toxicology, 549.
 Calculus, biliary, 209 (see also *Gallstones*); in lung, 166; renal, treatment, 233.
 Calder on frambesia, 436.
 Calomel, 476; in elephantiasis, 477; in pneumonia, 476; in pruritus ani, 477; in syphilis, 477.
 Calorific value of food materials, 621.
 Calvert (W. J.) on blood in filariasis, 327; on serum in plague, 76.
 Campbell (F. J.) on epileptic convulsions, 298.
 Campbell (H.) on Graves's disease, 106.
 Campbell (R. R.) on x-rays in acne, 422.
 Camphene, 615, 616; glycol, 615.
 Camphor, 477; in morphin habit, 477, 555.
 Cancroin, 477; in cancer, 477.
 Cannon and Day on salivary digestion in stomach, 513.
 Capillaries, contractility of, 511.
 Capillary bronchitis in children, 274.
 Capps (J. A.) on uncinariasis, 236.
 Carbohydrate acids, 92; acids, oxidation of, 617; group in protein molecule, 608.
 Carbohydrates split off from hydrobromic acid, 608.
 Carbolic acid, 478; in scarlet fever, 253; in smallpox, 477; in tetanus, 478; in variola, 72; poisoning, 558; poisoning, artificial respiration in, 559; poisoning in child, 557.
 Carbo-lysoform, 491.
 Carbon monoxid, toxicity of, 595.
 Carbonic acid test as index of atmospheric impurity, 599; toxicology, 549.
 Carcinoma and diabetes, 90; and malaria, relation between, 49; and tuberculosis, relation between, 31; cancroin in, 477; double, of gallbladder, 338; formalin in, 485; gallstone simulating, 210; gastric, 188; gastric, behavior of elastic tissue in, 358; gastric, diagnosis, early, 188; gastric, gastrocolic fistula from, 189; gastric, resistance of erythrocytes to hypotonic sodium-chlorid solutions in, 121; in Italy, vital statistics, 597; of biliary passages, pathology, 362; of esophagus, 172; of liver, urobilin in urine in, 633, 634; of skin, x-rays in, 438, 439; of stomach, 188 (see also *Carcinoma, gastric*); primary, of lung, 355; x-rays in, 503.
 Carcinomatous gastrocolic fistula, 189.

- Cardioptosis, relation of, to floating liver, 153.
 Cardiovascular system, diseases of, 140.
 Carey and Park on epidemic dysentery, 310.
 Carmichael on foreign bodies in gall-bladder, 614.
 Carpenter on myocarditis in children, 278.
 Casein and gelatin, serum with chloroform in dissolving, 611; enemas, nutritive value, 201.
 Cassia *beareana* in blackwater fever, 56.
 Castellani (A.) on etiology of sleeping-sickness, 80, 82.
 Castration, diminution of resting metabolism after, 523.
 Catarrh, colon, 194; gastro-intestinal, in children, urine in, 291; intestinal, high injections in, 201.
 Caton on valve-function in rheumatic endocarditis, 149.
 Cautley on congenital heart-disease, 351.
 Cautley and Dent on congenital stenosis of pylorus, 265.
 Cavernoma of liver, 361.
 Cephalin, 490.
 Cerebellar ataxia, 528; disease, 402; disease, position of head in, diagnostic value, 402.
 Cerebellum, physiology, 528; tumor of, 402.
 Cerebral glioma in children, 302; hemorrhage, 393; hemorrhage, trephining in, 393; localizations, 379; meninges, diseases of, 392; motor paralysis, sensations in, 394; sinuses, thrombosis of, 161; veins and sinuses, thrombosis of, with bronchopneumonia, 352.
 Cerebrin in chorea of children, 300.
 Cerebrospinal fluid, 399; fluid, cellular diagnosis of, 399; meningitis, epidemic, of horses, 323; meningitis in children, 298.
 Cestoda, 237.
 Chamberlain on remedy to contests of wills, 536.
 Chancre, soft, inoculation of monkeys with cause of, 322.
 Chancroid bacillus, 321.
 Chapin on infant mortality, 268.
 Chapman and Bardswell on pulmonary tuberculosis, 44.
 Charlton (G. A.) on scarlet fever, 251; on antistreptococcus serum, 469; on infection and subinfection by colon bacillus, 319.
 Charteris on action of arsenic on bone-marrow, 347.
 Chase on effect of alcohol on digestion, 465.
 Cheadle on acholia, 205.
 Chemical transformations in body, 613.
 Chemistry, physiologic, 601.
 Cheyney (W. F.) on lobar pneumonia in infancy, 273.
 Chittenden and Beebe on effect of alcohol on uric acid, 633.
 Chloralose, 478; in mental diseases, 478.
 Chlorid in urine, 517; toxicology, 549.
 Chlorodyne poisoning, 544.
 Chloroform, 478; action of, on heart, 510; effect of, on taste, 529; effect of, on urinary bladder, 519; in serum, dissolving casein and gelatin, 611.
 Chloroma, 136.
 Chlorosis, 127; arrhenal in, 128; blood in, chemical condition of, 127; in children, 279.
 Cholecystectomy, colicky attacks of pain after, 209.
 Cholecystitis, suppurative, pyemia from, 210.
 Cholelithiasis, stagnation-icterus in, 210.
 Cholera, 77; and insects, relation between, 77; antitoxin and vaccine in, 77; blood-examination in, 77; immune bodies, 609.
 Cholera infantum, 268.
 Cholesteatoma of brain, 370.
 Cholesterolemia and lipemia in diabetes mellitus, 609.
 Cholesterin in gallstones, origin, 614.
 Chondrodystrophy foetalis, 286, 288.
 Chondromas, histologic structure of, 337.
 Chorda and sympathetic saliva, temperature of, 513.
 Chorea, 403; arsenic in, 473; in children, cerebrin in, 300; in children, treatment, 299; minor in children, brachial monoplegia in course of, 299; minor in children, infectious origin, 299; minor, mortality from, 299; of pregnancy, 403.
 Chowning and Wilson on spotted fever, 73.
 Christian on fats of pneumonic exudates, 354.
 Chromidrosis, pathology, 442.
 Chrysophanic acid in psoriasis, 419.
 Churchill (F. S.) on blood in typhoid of children, 250.
 Chylous ascites, 214.
 Chyluria, 219; effects of diets on, 219.
 Circulation and heart, physiology, 509; stagnation of, influence of, upon temperature of joints, 111.
 Circulatory failure in children, enteroclysis in, 277; system, pathology and bacteriology, 350.
 Cirrhosis of liver, 89, 205; hemorrhagic, 207; in childhood, 271; pancreas in, 89, 363; stagnation, 207.
 Clark (L. P.) on daily rhythm of epilepsy, 409; on sodium chlorid in diet of epileptics, 475.
 Clark and Prout on epilepsy, 407.
 Clarke (J. M.) on peripheral neuritis, 382.

- Clemensen (P. C.) on Finsen's phototherapy, 444.
 Clowes on freezing-point depression and specific gravity of urine, 626.
 Club-fingers and osteoarthropathy, relation between, 113.
 Coagulation of blood, 506.
 Coagulins, immunization, in cold-blooded animals, 328.
 Cocain, 479; medicolegal aspects in regard to, 541.
 Cocainization, spinal, dangers in, 479.
 Codman (E.) on *x*-rays in malignant disease, 503.
 Cog-wheel breathing in tuberculosis, 37.
 Cohn (S.) on electricity in habitual constipation, 194.
 Colbeck (E. H.) on angina pectoris, 156; on tuberculosis, 37.
 Colchicin poisoning, 547.
 Cold in treatment of scarlet fever, 253.
 Cole (R. I.) on *Bacillus aerogenes capsulatus* in blood, 85.
 Cole (S. J.) on changes in central nervous system in chronic alcoholism, 383.
 Cole (S. W.) on somnoform, 497.
 Cole and Hopkins on tryptophan, 606.
 Coleman (W.) on typhoid-colon group of bacilli, 309; on urotropin, 502.
 Coleman and Ewing on septicemic glands in man, 319.
 Colic, renal, with suppression of urine, 234.
 Colitis, 194; mucous, etiology, 195.
 Collargol in septic conditions, 84; in staining malarial organisms, 53; in ulcerative endocarditis, 149.
 Collins (J.) on amyotrophic lateral sclerosis, 391; on muscular atrophy in tabes, 385; on tumors of spinal cord, 388.
 Colon bacillus, distribution of, in water, 320; bacillus, infection and subinfection by, 319; catarrh, 194; multiple diverticulum of, 359.
 Comey and McKibben on chylous ascites, 214.
 Complement, hemolytic, in blood of rabbits, 329.
 Complements, serum-, bacteriolytic, in disease, 329.
 Compressed air, 480.
 Condit (J. D.) on fibromyoma of stomach, 358; on multiple diverticulum of colon, 359.
 Connell on pneumonia, 59.
 Connor on poisoning by quinin, 545.
 Constipation, 193.
 Constitutional diseases in children, 282.
 Continued fever due to *Bacillus enteritidis*, 231; resembling enteric fever, 26.
 Convalescent-serum in scarlet fever, 253.
 Convulsive attacks in children, 297.
 Cook (H. W.) on blood-pressure in children, 280; on nitrogen-excretion in pneumonia, 59.
 Cook (J. C.) on angiosarcoma in children, 302.
 Coordination in utero, defective, as factor in cause of congenital malformations in children, 266.
 Copeman on pneumonia, 56.
 Corke on cassia beareana in blackwater fever, 56.
 Cornell on carbolic acid poisoning, 559.
 Corning (J. T.) on compressed air, 480.
 Corns, treatment, 430.
 Corrosive sublimate in syphilis, 456.
 Corrosives, poisoning by, 560.
 Cortical cells, changes of, in epilepsy, 407; writing-center, 400.
 Coryza and cough, causes, 164.
 Cotton (A. C.) on empyema in children, 276; on anatomic effects of tight diapers, 303; on cholera infantum, 268; on Widal test in typhoid of children, 249.
 Cough and coryza, causes, 164.
 Councilman, Magrath, and Brinckerhoff on supposed parasite of smallpox, 312; on variola, 69.
 Coutts on ependymitis in infant, 295.
 Cowan on heart in acute disease, 350.
 Cowen on tuberculosis, 31.
 Craig on continued fever due to *bacillus enteritidis*, 321.
 Craig (C. F.) on dysentery, 309; on Malta fever, 78.
 Craig and White on continued fever, 26.
 Crandall (F. M.) on rheumatic symptoms in children, 282.
 Crandall (G. C.) on recurrent diphtheria, 255.
 Crandon on prostatism, 367.
 Crane and Rachford on ammonium compounds, 548.
 Cranial nerves, diseases of, 392.
 Cream for home modification, 243.
 Creasote and guaiacol in tuberculosis, 45; in pneumonia, 61.
 Credé's silver in sepsis, 84.
 Cretinism, endemic, congenital myxedema, and infantile myxedema, differentiation, 289; sporadic, 289.
 Crile on adrenalin in shock, 464.
 Criminal abortion, 538; aspect of negro and his influence on white race, 562; insane, inadequate disposition of, 562; responsibility of epileptic, 561; statistics in England and Wales, 561.
 Crocker on potassium iodid, 495.
 Crofton (A. C.) on urinary calcium excretion in tuberculosis, 632; on relation of calcium salts to formation of uric acid calculi, 476.
 Crombie on typhoid fever, 22.
 Crombie and Bokenham on gastric dilation, 184.

- Cross on somnoform, 497.
 Crothers (T. D.) on children with alcoholic ancestors, 294.
 Croupous pneumonia in children, 273; knee-jerk in, 379.
 Crowder on tuberculosis of vermiciform appendix, 358.
 Cryogenin, 480.
 Cryoscopy, urinary, in diagnosis of disease of kidney, 227.
 Cumston on mercury cyanid, 492.
 Curry (J. J.) on effects of altitude upon blood, 118; on tuberculosis, 31.
 Curtin on strychnin in heart-disease, 498.
 Curvature of spine, lateral, and tuberculosis, relation between, 31.
 Cushing (H.) on persistence of sense of taste, 379.
 Cushny (A. R.) on saline diuresis, 517.
 Cutaneous diseases, 415. See also *Skin diseases*.
 Cyanosis, congenital, in children, 279.
 Cyclo albuminuria in children, 292; terpenes, destiny of, in organism, 615; vomiting in children, 267.
 Cylindruria in erysipelas, 224.
 Cyrtometer, 164.
 Cystic degeneration of kidneys, 234, 366; degeneration of liver, 208; epithelioma, 437; mastitis, chronic, 373.
 Cysts, dermoid, in children, 302; hydatid, myelitis due to, 390; retroperitoneal, 215.
 Cytodiagnosis, value of, 121.
 Cytolysins and antitoxin-production, adrenal gland and its active principle in relations to, 334; in normal blood-serums, plurality of, 328.
 Cytosin, 629.
- DA COSTA (J. C., Jr.) on degeneration of erythrocytes, 122.
 Dairies, personal inspection of, 242.
 Dalal on chlorodyne poisoning, 544.
 Dalton on dependence of skin affections on nutritive disturbances, 443.
 Dana (C. L.) on myoclonus, 407; on softening of pons and medulla, 396.
 Danforth (J. N.) on cystic degeneration of kidneys, 234, 366.
 Dare on determining alkalinity of blood, 115.
 Datura, botany, toxicology, and therapeutics of, 546.
 Davidson on naptha vapor poisoning, 542.
 Davis (L.) on chancreoid bacillus, 321.
 Davison and McCarthy on transverse myelitis in newborn, 298, 389.
 Day and Cannon on salivary digestion of stomach, 513.
 Dead body, medicolegal aspects, 532.
 Death certification, 599; due to accidents and injuries, 533; medicolegal aspects, 532; sudden, enlarged thymus as cause, 349; sudden, in infants, 290, 291.
 Delafield (F.) on pleurisy, 169.
 Delany (T. H.) on malaria, 54.
 Dementia, paretic, 411; treatment, 411.
 Dengue, 79.
 Dent and Cautley on stenosis of pylorus, 265.
 Dercum (F. X.) on adiposis dolorosa, 406.
 Dercum and McCarthy on adiposis dolorosa, 372.
 Dermatitidis coccidioides, 426; iodoform, treatment, 420; verrucosa, 435; x-ray, 425, 426.
 Dermatomyositis, 114.
 Dermatoses in exophthalmic goiter, 404; exophthalmic goiter, 443.
 Dermoid cyst in children, 302.
 De Schweinitz and Dorset on tubercle bacilli, 306, 632.
 Development, diseases of, in children, 284.
 Dextrose, chemistry, 608.
 Dhobie itch, 423.
 Diabetes insipidus, 100; amido-acid nitrogen in, 101; and diabetes mellitus, relation between, 101; hypnotism in, 102; in syphilis, 102; metabolism in, 101.
 Diabetes mellitus, 86; after knee injury, 91; albuminous food in, 97; and carcinoma, 90; and diabetes insipidus, relation between, 101; and glycosuria, alcoholism in relation to, 92; and tuberculosis, relation between, 93; aspirin in, 99, 100, 473; blood in, 94; calcium salts in, 100; complications, 93; experimental, reactions of blood in, 335; fruit in, 95; gangrene of leg in, 95; Graves's disease with, 107; hemochromatosis and, 362; in child, 92; in children, 284; influence of vegetable albumin in, 95; lipemia and cholesterolemia in, 609; lipemia in, 94; nature and etiology, 89; pancreas in, 94; potato-treatment, 99; relation of changes in pancreas to, 362; relation of fat to excretion of acetone bodies in, 95, 96, 97, 98; Stock's acetone-reaction in, 99; symptomatology, 93; traumatic, 91; treatment, 95; vegetables in, 95.
 Diabetes, pancreatic, with icterus gravis, 95.
 Diabetic glycosuria, excretion of levulose in, 87.
 Diachylon poisoning, 542.
 Diaper, 303.
 Diapers, tight, anatomic effects of, 303.
 Diarrhea, 192; epidemic, causes, 580; in children, 267, 268, 269; in children, dysentery bacillus in, 310; in chil-

- dren, fatal, factors which determine local influences, 580; in children, gelatin in, 487; in children, leukocytes in, 269; in children, mortality, 268; summer, flies in cause, 580.
- Diazo reaction in tuberculosis, 41; in typhoid fever, 21.
- Dickinson on spinal cocainization, 479.
- Dickson on gastric dilation with tetany, 183.
- Dicotrotism in typhoid fever, 13.
- Diet, horse-meat, effect of, on dogs, 633.
- Digestion, effect of alcohol on, 465; of meat, 609; physiology, 513; pancreatic end-products of, effects on sugar formation, 609; salivary in stomach, 513.
- Digestive system and pernicious anemia, relation between, 130, 131; diseases of, 170; pathology and bacteriology, 357; tuberculous infection through, 27, 28.
- Dillard (H. K.) on bromoform poisoning, 544.
- Dillard and von Harlingen on epicarin, 481; on tinea tonsurans and tinea circinata, 422, 423.
- Diller on myasthenia gravis and angioneurotic edema, 381.
- Dimethylamidobenzaldehyd reaction with urine, 215.
- Dionin, 480.
- Diphtheria, 254; antitoxin of, 254, 469; antitoxin of, in bronchopneumonia, 470; bacillus, serum for dissolving, 257; bacillus, distribution of, 575; cardiac thrombosis in, 255; cardiac trouble in, 255; heart-failure in, 255; hemorrhage in, gelatin in, 279; laryngeal, antitoxin in, 256; mortality from, 254; nasal, primary, 255; pseudotetanus in, 257; recurrent, 255; serum in, 256; toxin, effect of, on hemoglobin and blood-corpuscles, 334; treatment, 256.
- Diplococcus, encapsulated, in mastoiditis, 321; scarlatinæ, 251.
- Dipylidium, 237.
- Disability, medicolegal aspects, 538.
- Disinfectants, standardization of, 584; sulfurous acid as, 584.
- Disinfecting station, van for carriage of articles to, 583; wall paints, 583; wall paints, effect of, on tubercle bacilli, 583, 584.
- Disinfection, 583.
- Displacement of heart, 152.
- Diuresis, saline, physiology, 517.
- Diuretin, diuretic effect of, 231.
- Diverticulum, multiple, of colon, 359.
- Dixon (W. E.) on apocodein, 471.
- Dixon and Brodie on bronchial muscles, 512.
- Dock (G.) on amebic dysentery, 196.
- Dolbey on melanism in malaria, 52.
- Dore on psoriasis after vaccination, 419.
- Dore and Morris on x-ray in skin diseases, 432.
- Dorset and De Schweinitz on tubercle bacilli, 306, 632.
- Drainage, 591.
- Drains, private, 593.
- Drewry (W. F.) on criminal insane, 562.
- Dropsy, apocynum cannabinum in, 208; toxemie, in children, 272.
- Drummond on heart-disease, 143.
- Du Castel on lactic acid in pruritus, 442.
- Duckworth on alcohol and life insurance, 590; on antistreptococcic serum in infective endocarditis, 149; on tinea favosa capitis, 424.
- Ductless glands, diseases of, in children, 284; pathology and bacteriology, 340.
- Ductus arteriosus, aneurysmal dilation of, 351; Botalli, persistence of, 351.
- Dumas on remittent prolonged fevers of childhood, 267.
- Dunbar on hay-fever antitoxin, 487.
- Duodenal ulcer, 198.
- Duodenum, closure of, in child, 266; dilation of, in multiple neuritis, 182.
- Dust, suppression of, by petroleum and tar, 600.
- Dusting or sweeping by aspiration, 600.
- Dutton on trypanosome in blood, 238.
- Dwyer on typhoid fever, 15.
- Dyeing, theory of, 609.
- Dyer (I.) on blastomycosis of skin, 435.
- Dysentery, 196; amebic, 196; bacillus, experimental vaccination against, 311; bacillus in infantile diarrhea, 310; bacillus, Shiga, and serum reactions in epidemic dysentery, 310; chronic specific, of tropical origin, pathology, 309; gangrenous, 196; immune-serum, reaction of water bacteria with, 310; in Moscow, 196; magnesium sulfate in, 492; pathology and bacteriology, 309; serum in, 196; tropical methylene-blue in, 197; tropical, sulfur in, 197.
- EAR, internal, and equilibration, 528; sensitiveness of, 528.
- Earl on adenoma of liver, 361; on cavernomas of liver, 361.
- Eckles and Barnes on purification of milk, 590.
- Ectopia of adrenal, 350.
- Eczema, 417; in children, 301; naftalan in, 417.
- Edema, acute pulmonary, in children, 273; angioneurotic, and myasthenia gravis, 381; hereditary, 113; hereditary, in children, 291; in children, 263.
- Edestin, 604.
- Edgeworth on pleurisy, 167.

- Edsall (D. L.) on acid intoxication in children, 266.
 Edsall and Miller on akromegaly, 111, 406; on rectal absorption, 200, 630.
 Education, medical, 569.
 Edwards on pernicious anemia and coronary atheroma, 160.
 Egg, hen's, arsenic in, 608.
 Eggs, idiosyncrasy toward, 200.
 Ehrlich's dimethylamidobenzaldehyde reaction with urine, 215.
 Einhorn (M.) on cardiopatosis in relation to floating liver, 153; on gastric mucosa in pathologic conditions of stomach, 178; on pernicious anemia and achylia gastrica, 131.
 Electric conductivity of blood, 614; theories of nerve-activity, 525, 526.
 Electric-light baths in tuberculosis, 45.
 Electrophysiology, 525.
 Elephantiasis, calomel in, 477.
 Ellegood on pseudomembranous inflammation, 255.
 Elliott on chronic nephritis, 225.
 Ellis on poisoning by potassium chlorate, 550.
 Elmer on reducing cytometer, 164.
 Ely (T. C.) on Hodgkin's disease, 139; on cyclic vomiting, 267.
 Emboli, cellular, transportation of, through thoracic duct into lungs, 356.
 Embolism, 161; of bifurcation of aorta, 161; of superior mesenteric artery, 161; pulmonary, relation of post-operative pleurisy to, 167.
 Embryo, estimating age of, 536; wheat nucleic acid from, 622.
 Emetin, 490.
 Emphysema, subcutaneous, 32.
 Empyema in children, 276, 357; pathology, 276; physical signs, 276.
 Encephalitis and acute poliomyelitis in children, 296; nonsuppurative, 395.
 Endocardial thickenings and opacities, 351.
 Endocarditis, acute, 148; gonococcic, 352; gonorrhreal, 148; in pneumonia, 60; infective, antistreptococcic serum in, 149; malignant, 148; malignant, antistreptococcus serum in, 469; rheumatic, prevention of restoration of valve-function in, 149; ulcerative, 149; ulcerative, collargol in, 149; ulcerative, healing of, 148.
 Enemas, casein, nutritive value of, 201; rectal, use of, 201.
 Engelmann on sporadic cretinism, 289.
 English on thyroid extract in psoriasis, 419.
 Engmann on impetigo contagiosa, 420.
 Engmann and Loth on suprarenal extract in skin diseases, 449.
 Ensor and Barrett on paroxysmal hemoglobinuria, 219.
 Enteroclysis in circulatory failure, 277.
 Enterokinase, 515.
 Enuresis in children, treatment, 292; nocturnal, lycopodium in, 292.
 Enzymes action of, reversibility of, 613; glycolytic, 609; in amniotic liquid, 612; manner of action, 610; of anthrax, 612; physiologic chemistry, 609; proteolytic, 333; proteolytic, of urine, origin, 614.
 Eosinophiles, granular, in tissues, 375.
 Eosinophilia, hydatid disease associated with, 127.
 Ependymitis, acute, in children, 295.
 Epicarín, 481; in ringworm, 481; in tinea circinata, 422; in tinea tonsurans, 422.
 Epilepsy, 407; blood in, 408; bromopin in, 475; cortical cells in, changes in, 407; daily rhythm of, 409; essential, in children, 298; eye in, metallic gloss of, 409; in children, Balint's dietetic treatment, 298; in children, causes, 297; larval form, 409; pathology, 410; sensory aura of, 410; treatment, dietetic, 410.
 Epileptic character of paroxysmal tachycardia, 409; convulsions in children, 298; criminal responsibility of, 561.
 Epinephrin and adrenalin, relation between, 632; effects of, 548; hydrate, 632.
 Epithelioma, cystic, benign, 437; primary, of uvula and soft palate, 357.
 Epithelium, renal, disturbance in regeneration of, 365.
 Epizootic cerebrospinal meningitis of horses, 323.
 Equilibration, internal ear and, 528.
 Erdmann and Huber on intussusception, 270.
 Ergot, 481; in nervous diseases, 481; in pneumonia, 481.
 Erysipelas, albuminuria and cylindruria in, 224.
 Erythema, angioneurotic, 405; nodosum, 416; nodosum in children, 301; scarlatiniforme, intermittent, malarial origin, 416.
 Erythrocytes, 121; agglutinated, thrombi composed of, 345; degeneration of, 122; effect of lecithin on, 529; granulations of, 123; in malaria, 54; origin of basophile granules in, 123; resistance of, in pernicious anemia, 122; resistance of, to hypotonic sodium-chlorid solutions, in carcinoma of stomach, 121; transfusion of, in artificial serum, 122.
 Erythromelalgia, 383; complicating splenic anemia, 138; pathologic changes in, 370.
 Erythroplœum, 482.
 Eshner (A. A.) on peripheral neuritis in whooping-cough, 383.

- Esophagus, atonic dilation of lower end, 172; carcinoma of, 172; congenital absence of, 357; diseases of, 172; stenosis of, thiosinamin in, 500; tuberculosis of, 357.
- Ether, 482; as anesthetic, 482; effect of, on nitrogenous metabolism, 482, 483; inhalation, glycosuria from, 88.
- Ethics, medical, 568.
- Ethyl bromid, 483; bromid as anesthetic, 483; chlorid, 483; chlorid as anesthetic, 483; iodid, 484; iodid in whooping-cough, 259.
- Ethylene-diamin compound of mercury and sublamin, toxicology of, 559.
- Eucaïn B, 484.
- Euquinin, 481.
- Evans (G. H.) on infection with *Uncinaria americana*, 235.
- Evans (T.) on gangrenous dysentery, 196.
- Evans (N.) on blastomycosis of skin, 435.
- Everett (H. H.) on ether asphyxia, 482.
- Ewald (C. A.) on atypic typhoid fever, 13.
- Ewing (C. B.) on cultures from plague blood, 75.
- Exalgin, bad effects after, 548.
- Exophthalmic goiter, 105, 404; and rheumatoid arthritis, relation between, 110; blood-pressure in, 106; dermatoses in, 404; dermatoses in, 443; goats' milk in, 108; in children, 300, 404; operation in, 108; pigmentation of skin in, 107; produced, 405; treatment, 107; tremor in, 107; with diabetes mellitus, 107; with glycosuria, 107; with rheumatoid arthritis, 404.
- Experimental therapeutics, 461.
- Eye in epilepsy, metallic gloss of, 409.
- Eyre and Washbourne on *Bacillus influenzae*, 72.
- FACE, lupus erythematosus of, 431.
- Facial paralysis, 392.
- Factories and workshops, ventilation of, 585.
- Fairbarn on fibroma of ovary, 339.
- Family idiocy, amaurotic, 412.
- Fasting, effect of, on blood, 118.
- Fat, absorption of, 516; absorption of, action of drugs on, 516; necrosis, relation of trauma to, 213; of pneumonic exudates, 354; of renal infarcts, 367; of tubercle bacilli, 632; stained with alkanna red, absorption of, without digestion, 191.
- Fat-necrosis, experimental, 374.
- Fatty degeneration, 367, 371; heart, pathology, 350.
- Favus of serotum with ringworm of thigh, 423.
- Feces, indol in, detection of, 619; numbers of bacteria in, 191.
- Fecundity of French Canadians, 598.
- Femoral thrombosis in pneumonia, 60.
- Fenton on heart-failure in diphtheria, 255.
- Ferment, fibrin-, 507.
- Ferments, proteolytic, protection against, 516; soluble, in milk, 242.
- Ferric hydroxid in arsenical poisoning, 552.
- Ferruginous milk, 242.
- Fest on malaria, 50.
- Fetal liver, glycogen in, 618.
- Feticide, 568.
- Fibrin-ferment, 507.
- Fibrinous bronchitis, causes, 165; bronchitis, pathology, 165; exudate in septic peritonitis, bacteriology, 325.
- Fibroid, uterine, iodipin in, 490.
- Fibroma, multiple, of nerves of lower extremities, 340; of ovary, 339.
- Fibromyoma of stomach, 358.
- Fibroneuroma, 340.
- Field on Banti's disease, 358.
- Filariasis, blood in, 327.
- File-making as dangerous occupation, 587.
- Finkelstein on opium poisoning, 554.
- Finsen lamp, new form, 449; light in diseases of skin, 444; light in lupus, 431, 432; light in lupus vulgaris, 493.
- Finsen (N. R.) on red-light treatment of smallpox, 72, 427, 444, 494.
- Firth and Horrocks on dissemination of enteric infection, 307.
- Fischer (L.) on milk idiosyncrasy, 244; on summer disorders in infants, 269.
- Fisher (M. E.) on diabetes mellitus, 284.
- Fisher (T.) on rheumatic myocarditis, 353; on thrombosis of cerebral veins and sinuses, 352.
- Fissures of anus, pruritus and, 442.
- Fistula between bile-passages and bronchus, 211; gastrocolic, 186; gastrocolic, carcinomatous, 189.
- Flagellums and bacteria, agglutinins acting on, nonidentity of, 333.
- Flax-spinning, hygiene of, 585.
- Fletcher on cholesteatoma of brain, 370.
- Flexner (S.) on agglutination of red blood-corpuscles, 345; on autolysis in lobar and unresolved pneumonia, 354; on lymphotoxic and myelotoxic intoxication, 330.
- Flexner and Noguchi on cytolsins in normal blood-serums, 328.
- Flies, conveying of typhoid fever by, 12; a cause of typhoid fever and summer diarrhea, 580.
- Floating liver, relation of cardioptosis to, 153.
- Fluoroform, 486.
- Fogg (E. S.) on gastrophtosis, 184.
- Folin (O.) on rigor mortis, 525, 622.

- Food inspection, 588; materials, calorific value of, 621; preservation, 589.
 Food-tuberculosis, 28.
 Foot-and-mouth disease in children from milk, 263.
 Forage-poisoning, pathology, 323.
 Forchheimer (F.) on dermatomyositis, 114; on acute appendicitis after amygdalitis, 269; on jaundice following an injection of tonsils, 270.
 Fordyce (J. A.) on eczema, 417.
 Foreign bodies in gallbladder, physiologic chemistry, 614; in heart, 152.
 Formalin, 484; in cancer, 485; in septicemia, 485; in streptococcus infection, 484; in tuberculosis, 485; poisoning, 550.
 Formalin-alcohol-ether mixture in tuberculosis, 45.
 Forster on alcoholic poisoning, 551.
 Fortoin, 485.
 Foulerton on sanatorium for tuberculosis, 574.
 Foulerton and Fowler on hemorrhagic typhoid fever, 17.
 Fourth disease, 258.
 Fowler (J. S.) on splenic anemia of infants, 282.
 Fowler and Foulerton on hemorrhagic typhoid fever, 17.
 Fowler's solution in chorea, 473.
 Fox (G. H.) on treatment of psoriasis, 419.
 Fox (J. C.) on frambesia, 436.
 Frambesia in fowls, 436; tropical, 424; and syphilis, 459.
 Francine and Steele on gastrophtosis, 184.
 Fraser (H.) on relapses of scarlet fever, 251.
 Fraser (T. R.) on cacodylates, 476.
 Freeland (E. H.) on treatment of corns, 430.
 Freezing-point depression and specific gravity of urine, 626; of blood, effect of exclusion of liver on, 203; of blood, influence of removal of liver on, 335.
 Freund (L.) on Röntgen rays, 448.
 Fridenberg (A. H.) on hydrogen dioxid in mercurial stomatitis, 488.
 Friedenwald (J.) on stomach-tube, 179.
 Friedländer's apparatus for counting leukocytes, 115; bacillus, infection with, 85.
 Fuller (E.) on mercury in syphilis, 455.
 Fungus in relation to pathologic changes in stomach, 176; in stomach, 177.
 Furuncles, solution of iodin in acetone in, 425.
 Fussell (M. H.) on diphtheria, 254, 470.
 Fussell and Riesman on pneumothorax, 169, 356; on spontaneous nontuberculous pneumothorax, 356.
 Futcher (T.) on gout, 104.
- GALLBLADDER, double carcinoma of, 338; foreign bodies in, physiologic chemistry, 614; gallstones placed in, 614; perforation of, 211.
 Gallstones, 209; cholesterol in, origin, 614; intestinal obstruction from, 199; placed in gallbladder, 614; radiography in, 209; simulating carcinoma, 210.
 Gamgee and Hill on optical properties of oxyhemoglobin and carbon monoxid hemoglobin, 613.
 Gamgee and Jones on nucleic acid of thymus, 624; on optical activity of albuminous substances, 623.
 Gamlin (H. E.) on lupus, 432.
 Gangrene after injection of oily solution of mercury biniiodid, 443; in typhoid fever, 18; of leg in diabetes, 95.
 Gangrenous dysentery, 196.
 Gardner (H. W.) on hypertrophic stenosis of pylorus in infant, 265.
 Gardner, Spitto, and Latham on *lachnanthes tinctoria*, 491.
 Gas-cavities in brain, 395.
 Gastrectasis, gastrophtosis with, 184.
 Gastric absorption in children, 265; carcinoma, 188 (see also *Carcinoma, gastric*); dilation, 181; dilation, causes, 181; dilation, complications, 183; dilation, diagnosis, 182; dilation, treatment, 182, 184; dilation with tetany, 183; disease, general considerations concerning, 175; hydrochloric acid in, 179; disease, mimicry of, by spinal disease, 179; hyperacidity, olive oil in, 493; hypersecretion, 177; juice in children, 265; juice, lipase in, 613; juice, physiology, 513; juice, psychic, 628; juice, secretion of, action of alcohol on, 513; juice, secretion of, influence of hemorrhage on, 514; juice, secretion of, influence of morphin upon, 178; mucosa in pathologic conditions of stomach, 178; sarcoma, 190; syphilis, 188; tetany in children, 300; ulcer, 185 (see also *Ulcer, gastric*).
 Gastritis, 180; chronic, in children, 265; experimental production of, 180.
 Gastrocolic fistula, 186; carcinomatous 189.
 Gastro-intestinal catarrh in children, urine in, 291; musculature, electric reactions of, 178.
 Gastrophtosis, 184; with gastrectasis, 184.
 Gastrotoxin, 336.
 Gelatin, 486; and casein, serum with chloroform in dissolving, 611; in aortic aneurysm, 160, 487; in diarrhea in children, 487; in hemophilia, 486; in hemoptysis, 486; in hemorrhage, 486; in hemorrhage in diphtheria, 279; in purpura in children, 280; in tuberculosis, 46; tetanus from, 486.

- Gelatose-silver nitrate in diseases of intestines, 202.
 Gemmill and Mabry on cholera, 77.
 Genital tuberculosis in children, 293.
 Genito-urinary tract, diseases of, in children, 291; effect of salicylic preparations upon, 224.
 Gerold on neutralizing toxic action of tobacco, 543.
 Gershon on subcutaneous abscesses, 293.
 Gibson on lupus vulgaris, 433.
 Gibson, Bullman, and Conder on adhesive mediastinopericarditis, 146.
 Gies on peptic proteolysis, 625.
 Gies and Lemsem on protagon of brain, 608.
 Gilchrist on acne vulgaris, 422.
 Gildersleeve and Abbott on proteolytic enzymes, 333.
 Gilliland and Pearson on immunizing cattle against tuberculosis, 42.
 Gimlette (J. D.) on datura, 546.
 Girard (H.) on ethyl chlorid, 484.
 Glanders of lung, 355; septicemia, in man, 319.
 Glands, tuberculous, of neck, suppuration of, 307.
 Glandular enlargement, 36.
 Glioma, cerebral, in children, 302.
 Globulin, action of radium salts on, 629.
 Glucoproteids, formation of glycogen from, 618.
 Glucose in urine, fermentation-method of determining, 86.
 Glucuronic acid, excretion of, 617; in icteric urine, 617; increase in amount, 617; of dog's blood, 617; physiologic chemistry, 615; source of, 617.
 Glycerolates in skin diseases, 450.
 Glycogen, 487; formation of, from glucoproteids, 618; formation of, in liver, 618; in fetal liver, 618; metabolism, 523; occurrence of, under pathologic conditions, 372; physiologic chemistry, 617.
 Glycol, camphene, 615.
 Glycolysis, 89; in blood, 89.
 Glycolytic enzyme, 609.
 Glycosuria, 86; adrenal, 520; alimentary, after narcosis, 521; and diabetes mellitus, alcoholism in relation to, 92; and levulosuria in diseases of liver, 204; aspirin in, 99, 100; diabetic, excretion of levulose in, 87; effect of drugs upon, 99; from inhalation of ether, 88; Graves's disease with, 107; in mental diseases, 88; phloridzin, 90, 519, 626; phloridzin, source of sugar in, 520; and suprarenal extract, 88.
 Glycuronic acid, 93.
 Goiter, exophthalmic, 105, 404. See also *Exophthalmic goiter*.
 Gold miner's consumption, 586.
 Goldsmith (F.) on tropical dysentery, 197.
 Gonococcic endocarditis, 352.
 Gonococcus in children, subcutaneous abscesses due to, 293.
 Gonorrhea, argyrol in, 472.
 Gonorrhreal endocarditis, 148.
 Good (C. A.) on lithium salts, 491.
 Goodall and Johnson on blood-serum in insanity, 412, 413.
 Gordinier on aortic aneurysm, 159; on cortical writing-center, 400.
 Gordon (A.) on acute morphin poisoning, 555; on sensations in motor paralysis of cerebral origin, 394; on syringomyelia, 392.
 Gordon (H. L.) on purpura, 137; on purpura rheumatica in child, 280.
 Gottheil (W. S.) on actinotherapy, 449.
 Gout, 102; adenin in, deposits after use of, 102; diagnosis, 104; frequency of, in United States, 104; nodules in, 105; nature and etiology, 102; pathology, 103; pathology of, alloxur bodies and, 373; quinic acid in, 105.
 Gowers on myopathy in children, 301.
 Gradwohl on tetanus following vaccination, 264.
 Graham-Smith on diphtheria bacillus and bacillus of Hofmann, 575.
 Graham-Smith and Sanger on biologic test for blood, 627.
 Granular kidney, dietetic treatment, 230.
 Graves's disease, 105, 404. See also *Exophthalmic goiter*.
 Gray on experimental vaccination against dysentery bacillus, 311.
 Green and Schwab on insular sclerosis, 392.
 Greene on percussion-sign of pleuritic effusion, 167.
 Greenlees on mental symptoms in heart disease, 413.
 Greenough and Hartwell on cystic mastitis, 373.
 Griffin on syphilis, 451.
 Griffith (J. P. C.) on cerebrospinal fever, 298; on sudden and unexpected death in early life, 290; on typhoid fever in infants, 248.
 Griffith and Ostheimer on typhoid fever in children, 249.
 Grim on cryoscopy, 227.
 Grubbs on vessels as carriers of mosquitos, 581.
 Grube on formation of glycogen, 618.
 Gruenling (E.) on abscess of brain, 397.
 Guaiacol, 487; and creasote in tuberculosis, 45; in parotiditis in children, 264; in smallpox, 487.
 Guernsey van for carriage of infected articles, 583.
 Guthrie (C. C.) on hemolysis, 507.
 Guthrie (L.) on tuberculous peritonitis, 261.
 Gwyn (N. B.) on gastric carcinoma, 188.

- HABHEGGER on malignant endocarditis, 148.
 Haffkine's prophylactic for plague, 76, 467.
 Hall (A.) on blue toes, 442.
 Hall (J. W.) on purinometer, 104.
 Hall (J. N.) on cyanotic polycythemia, 117; on tuberculosis, 37; on dilation of intestine, 271; on embolism, 161.
 Hall-Edwards on lupus vulgaris, 434; on potassium permanganate in lupus vulgaris, 495.
 Halleck on treatment of morphinism, 556.
 Hamill on sinus thrombosis in child, 294.
 Hamilton (A.) on typhoid fever, 12.
 Hamilton (A. S.) on rupture of heart, 151.
 Hamilton and Young on human and bovine tuberculosis, 572.
 Hammond on neurotic children, 293.
 Hancock (J. C.) on variola, 70.
 Hand (A., Jr.) on cyclic vomiting, 267; on lumbar puncture in diagnosis of meningitis, 296; on tuberculosis in children, 260.
 Hands, tuberculous angiodermatitis of, 431.
 Hardaway (W. A.) on treatment of syphilis, 455.
 Hardening process in children, 302.
 Hardy on action of radium salts on globulin, 629.
 Hare (H. A.) on effect of alcohol on bacteriolytic power of blood, 466; on morphin in uremic convulsions, 493.
 Harley and Barratt on gallstones placed in gallbladder, 614.
 Harrington and Harris on germicidal action of alcohol, 331.
 Harrington and Walker on alcohol, 466.
 Harris (F. G.) on acetozone in typhoid fever, 23, 462.
 Harris (H. F.) on ankylostomiasis, 327; on ankylostomiasis with symptoms of pellagra, 235; on uncinariasis, 235.
 Harris (J. R.) on fibrinous bronchitis, 165.
 Harris and Harrington on germicidal action of alcohol, 331.
 Harris and Johnston on gonorrhreal endocarditis, 148, 352.
 Harris and Osborne on triticonucleic acid, 623.
 Harris and Ott on adrenalin, 463.
 Harrison and Wills on Finsen light in lupus vulgaris, 493.
 Hartshorn on infant-feeding, 244.
 Hartsock on blackwater fever, 50.
 Hartwell and Greenough on chronic cystic mastitis, 373.
 Hartzell (M. B.) on benign cystic epithelioma, 437.
 Hassell and Stiles on Strongyloides stercoralis, 327.
 Hatcher and Sollmann on chlorid in urine, 517.
 Hay-fever antitoxin, 487; nitrohydrochloric acid in, 493.
 HCl free in stomach-contents, dimethylamidoazobenzol test for, 173.
 Head, position of, in cerebellar disease, diagnostic value, 402.
 Heart, action of calcium on, 509; action of chloroform in, 510; action of substances on, 510; and bloodvessels in children, diseases of, 277; and circulation, physiology, 509; aneurysm of, 151; coefficients in measurements of, 142; disease, alcohol in, 156; disease and pulmonary tuberculosis, relation between, 32; disease, chronic, treatment, 156; disease, congenital, 150, 351; disease, diagnosis, 143; disease, frequency of functional murmurs in, 143; disease in children, 277; disease, mental symptoms in, 413; disease, strychnin in, 498; diseases of, 142; displacement of, 152; effect of butter on, 510; effect of training upon or recovery of power of, 142; heart, fatty, pathology, 350; foreign body in, 152; hypertrophy of, in disease of kidney, 225; in acute disease, 350; involvement of, in diphtheria, 255; measurements of, in tuberculosis, 142; rheumatic, in children, 277; rhythm of, disturbances of, 153; rupture of, 151, 532; single, two aneurysms in, 352; syphilis of, 354; syphilitic disease of, 143; thrombosis of, in diphtheria, 255; valvular disease of, in children, 277; wandering, 152.
 Heart-failure, adrenalin in, 463, 464; in diphtheria, 255.
 Heart-murmurs, diastolic, 144; functional, 143.
 Heart-nerves, physiology, 509.
 Heat, animal, 525; in itching of ivy poisoning, 420; in rheumatism, 68; influence of, upon movements of leukocytes, 124.
 Heberden's nodes, 110.
 Hebra, prurigo of, treatment, 420.
 Hedonal, 487; as hypnotic, 487, 488; in insanity, 487, 488.
 Heidsfeld on chromidrosis, 442; on x-ray and trikresol in alopecia areata, 429; on mercury in syphilis, 456.
 Hektoen (L.) on streptococci in scarlet fever, 251, 318.
 Helmitol, 488; in kidney disease, 232.
 Hemagglutinins, serum, cold-blooded animals, multiplicity of, 332.
 Hemangiiosarcoma of thyroid, 338.
 Hematocrit for examining blood, 115.
 Hematuria, 219; hysterical, 219; parasitic, 327.
 Hemiplegia, progressively developing, 394.

- Hemisystole, 143.
 Hemochromatosis and diabetes mellitus, 362.
 Hemoglobin, crystallized, Reicher's methods of obtaining, 618; effect of diphtheria and tetanus toxins on, 334; in arsenical neuritis, 552; oxygen capacity of, 618; physiology, 508.
 Hemoglobinuria, 219; from quinin in malaria, 51; malarial, and uncinariasis, 52; paroxysmal, 219; paroxysmal, in children, 279.
 Hemoglobinuric fever and malaria, 50, 51.
 Hemolymph glands, formation of, from adipose tissue, 341.
 Hemolysins, immunization, in cold-blooded animals, 328.
 Hemolysis, 121, 328, 507; in experimental infection, 332; influence of alcoholic intoxication upon, 330.
 Hemolytic complement in blood of rabbit, 329; reaction, uremic, 229; power of blood-serum, change of, 333.
 Hemophilia, 137; gelatin in, 486; in children, calcium chlorid in, 280.
 Hemoptysis as sign of pleurisy, 167; as symptom of tuberculosis, 40; gelatin in, 486.
 Hemorrhage, adrenalin in, 464; anemia from, 119; cerebral, 393; cerebral, trephining in, 393; gelatin in, 486; in diphtheria, gelatin in, 279; in malaria, cachexia as cause, 50; influence of, on gastric secretion, 514; into suprarenal glands, 349; spontaneous, in newborn, 280.
 Hemorrhagic cirrhosis of liver, 207; erosions of stomach, 180; polymyositis, 114; typhoid fever, 17.
 Hemostatic, adrenalin as, 464.
 Hendrickson and Spiller on sarcomatosis of central nervous system, 398.
 Henry (F. P.) on treatment of pneumonia, 61.
 Henry (J. N.) on fecal impaction in typhoid fever, 15.
 Hepatic vein, closure of, 359.
 Hepatoptosis, 208; in producing biliary obstruction, 208.
 Herbert (H.) on methylene-blue in tuberculosis, 492.
 Hermophenyl in syphilis, 458.
 Heroin, 488; as reducing blood-pressure, 142; habit, 556; in diseases of children, 303; poisoning, 557.
 Herpes zoster, 385; malarial origin, 325, 418; prevalence, 421; recurrences, 421.
 Herrick (A. B.) on anemia from Uncinaria duodenalis, 236.
 Herrick (C. J.) on respiratory center, 511.
 Herrick (J. B.) on healing of ulcerative endocarditis, 148; on pericarditic pseudocirrhosis of liver, 146; on pneumococcic arthritis, 62, 319; on severe anemia from hemorrhages, 119.
 Herrman (C.) on paroxysmal hemoglobinuria, 279.
 Herschman (L. J.) on cause of obstipation, 194.
 Herter and Wakeman on origin of cholesterol in gallstones, 614.
 Hetol in tuberculosis, 45.
 Hewetson on leukocytes in pneumonia, 59.
 Hewlett on paratyphoid fever, 26.
 Hewlett and Tunnicliffe on lysoform, 491.
 Hewlett and Wood on achondroplasia, 286.
 Hichens on thrombosis of cerebral sinuses, 161.
 Hildreth on apocynum cannabinum in dropsy, 208.
 Hill (A. C.) on reversibility of enzyme action, 613.
 Hill and Gamgee on optical properties of oxyhemoglobin and carbon monoxide hemoglobin, 623.
 Hill and Macleod on compressed and rarefied air, 512.
 Hillier on extinction of tuberculosis, 573.
 Hills (F. L.) on hedonal in insanity, 487.
 Hirschlauff on serum for morphin poisoning, 554.
 Hirudin, 621.
 Hislop on Malta fever, 78.
 Histidin, 603; physiologic chemistry, 629.
 Histin, 629.
 Hoagland on pneumonia, 59.
 Hodgetts (C. A.) on variola, 70.
 Hodgkin's disease 139, 343, 344; and tuberculosis, differentiation, 35.
 Hoffman (F. L.) on suicides in United States, 562.
 Hofmann, bacillus of, distribution, 575.
 Holland (G. W.) on poisoning with oil of pennyroyal, 544.
 Hollopeter on causes of anemia in childhood, 279.
 Homogentisic acids, 618.
 Hoover on vesicular respiratory sound, 163.
 Hopkins (F. G.) on malaria and hemoglobinuric fever, 50.
 Hopkins (F. T.) on lycopodium in nocturnal enuresis, 292.
 Hopkins (G. G.) on Finsen apparatus in lupus, 432.
 Hopkins (S. D.) on prolonged loss of memory, 567.
 Hopkins and Cole on tryptophan, 606.
 Hopkins and Seligman on splenic anemia, 139.
 Hopogean, 492.

- Horn, hydrolysis of, serin from, 604.
 Hornabrook on antiplague serum, 467.
 Hornibrook on Haffkine's prophylactic, 76.
 Horrocks and Firth on dissemination of enteric infection, 307.
 Horse-meat, consumption of, in Italy, 590; diet, effect of, on dogs, 633.
 Horton-Smith on typhoid fever, 12.
 Hot-air in lupus, 434.
 Hour-glass stomach, diagnosis, 186.
 Howard (W. T., Jr.) on blood-serum in variola, 312; on actinomycosis of central nervous system, 369; on herpes zoster, 385.
 Howard and Perkins on granular eosinophiles in tissues, 375.
 Huber on brachial monoplegia in course of chorea minor, 299.
 Huber and Erdmann on intussusception, 270.
 Hudson (W. H.) on tumor of cerebellum, 402.
 Huger and Tucker on Justus test for syphilis, 454.
 Huggard on ethyl bromid anesthesia, 483.
 Hughes and Kerley on diarrhea in children, 268.
 Hunt (J. R.) on paramyoclonus multiplex, 406.
 Hunt (R.) on toxicity of methyl alcohol, 551.
 Hunter (W.) on nature and etiology of pernicious anemia, 129.
 Hunter (W. K.) on tuberculous tumor in spinal cord, 307.
 Huppert's reaction for bile-pigments, modification, 203, 608.
 Hutchison (R.) on sodium phosphate, 497.
 Hyaline degeneration of malpighian bodies of kidney, 366.
 Hydatid cyst, double, in children, 302; cysts, myelitis due to, 390; disease associated with eosinophilia, 127.
 Hyde and McEwen on dermatoses in exophthalmic goiter, 404, 443.
 Hyde, Montgomery, and Ormsby on x-rays in skin cancer, 438.
 Hydrobromic acid, carbohydrates split from, 608.
 Hydrocephalus, chronic internal, lumbar puncture in, 295; partial internal, 371.
 Hydrochloric acid for gastric disease, 179.
 Hydrogen dioxid, 488; dioxid and other catalytic agents, reaction between, 611; dioxid in mercurial stomatitis, 488; dioxid in milk, detection, 621; sulfuretted, poisoning by, 543.
 Hydrolysis of horn, serin from, 604.
 Hydrophobia, 82.
 Hydrops cystidis felleæ, 614.
 Hydroxid, ferric, in arsenic poisoning, 552.
 Hydruria, 521.
 Hygiene, industrial, 585; public, 571.
 Hyoscin, 488; in morphinism, 488, 489; treatment of morphin habit, 556.
 Hyperacidity, gastric, olive oil in, 493; of stomach, 179; of stomach, bismuthose in, 187.
 Hyperostosis cranii, osteitis deformans and, 372.
 Hypertrophy of brain in children, 295; of heart in disease of kidney, 225.
 Hypnotic, hedonal as, 487, 488.
 Hypnotism in diabetes insipidus, 102.
 Hypodermoclysis and infusion in uremia, 233; with salt solution, effects of, 233.
 Hysteria, medicolegal aspects, 539.
 Hysteric hematuria, 219.
- Iced liver, 145.
 Ichthargan, 489.
 Ichthyol, 489; in ivy-poisoning, 550; in tuberculosis, 489.
 Icterus, 202; gravis, pancreatic diabetes with, 95; in children following injection of tonsils, 270; neonatorum, 271; pruritus with, thyroid extract in, 442; stagnation-, in cholelithiasis, 210; urine in, glucuronie acid in, 617.
 Identification, Bertillon method of, 564.
 Idiocy, amaurotic family, 412; myxedematous, 290.
 Idiosyncrasy for iodoform, 546; toward eggs, 200.
 Iliac fossa, diagnosis of abnormalities in, 197.
 Iliopsoas muscle as aid in diagnosis of abnormalities in iliac fossa, 197.
 Immune bodies, cholera, 609.
 Immunity, 328.
 Impetigo contagiosa, treatment, 420.
 Indian, origin of, 619.
 Indicanuria, 217; relation of, to diseases of stomach, 619.
 Indol in feces, detection of, 619.
 Industrial hygiene, 585.
 Infant mortality, 242.
 Infant-feeding, 241; buttermilk in, 245, 246; sterilized milk in, 246.
 Infantilism, 289.
 Infection, neuroses due to, 402.
 Infections, slight relations of, to blood-forming apparatus, 346.
 Infectious diseases, 11; in children, 248; management and control, 572.
 Inflammation of spinal column, 110; pseudomembranous, 255.
 Influenza, 72; and suppurative meningitis, 258; atmosphere in, 73; diagnosis, bacteriologic, 72, 73; in children, 258.
 Influenzal meningitis, 73.
 Infusoria, 238; in stomach, 176.
 Ingals on croupous pneumonia, 60.

- Injuries and accidents, death due to, 533; personal, medicolegal aspects, 535.
 Injury of brachial plexus at birth, 384.
 Innominate artery, obliteration of, 352.
 Insane, criminal, inadequate disposition of, 562; fragility of bones in, 412.
 Insanity, blood-serum in, 413; hedonal in, 487, 488; increasing, from excessive mental work of children, 294; treatment of, 412.
 Insurance, life, alcohol and, 590; medicolegal aspects, 533.
 Intermittent fever, diagnosis, microscopic, 52; limping, 380.
 Interstitial pneumonia and peribronchitis in children, 275.
 Intestinal bacteria in nutrition, 190; catarrh, high injections in, 201; obstruction from gallstones, 199; putrefaction, 192; stenosis, 199; stenosis, treatment, 199; ulceration, 198.
 Intestines, absorption of fat in, action of drugs on, 516; dilation of, congenital, in infant, 271; diseases of, 190; diseases of, gelatose-silver nitrate in, 202; effect of butyric acid upon, 192; effect of organic acids upon, 192; infant's, starch-digesting capacity of, 248; lymphatic apparatus of, relation of, to absorption, 517; passing rubber tube into, 202; ulcers of, multiple, 198.
 Intoxication, acid, in children, 266; alcoholic, influence of, on hemolysis, 330; lymphotoxic and myelotoxic, 330.
 Intoxications, 328.
 Intussusception in children, 270.
 Iodids, alkaline, absorption of, from stomach, 175.
 Iodin, 489; compounds in syphilis, 459; in acetone, solution of, in furuncles, 425; in animal and vegetable tissues, 619; in urine, 216.
 Iodin-binding groups in proteids, 619.
 Iodin-reaction, clinical value of, with leukocytes, 126.
 Iodipin, 489; in uterine fibroid, 490.
 Iodoform dermatitis, treatment, 420; idiosyncrasy for, 546.
 Iodothyrin, 490.
 Ion, ammonium, toxicology, 548; potassium, toxicology, 549.
 Ions, antitoxic actions of, 526.
 Ipecac, 490.
 Iron, 491; absorption of, 516; and arsenic, relative effect of, 491; in anemia, effect of, 128; in blood, determining, 116; in organisms, behavior of, 127.
 Isatin-hydrochloric acid method for determination of indican in urine, 217.
 Islands of Langerhans, physiology, 521.
 Isocamphanilic aldehyd, 615.
 Itch, Dhobie, 423.
 Itching of ivy-poisoning, heat in, 420.
 Ivy-poisoning, ichthyol in, 550; itching of, heat in, 420.
 Izal in tinea favosa capititis, 424.

 JACKSON on phloridzin glycosuria, 626.
 Jackson (G. T.) on ringworm, 422.
 Jackson and Mandle on source of glucuronic acid, 617.
 Jackson and Wallace on effect of alcohol on gastric secretion, 514.
 Jacobi (A.) on epilepsy in children, 297; on peribronchitis and interstitial pneumonia, 275; on musical murmur in aortic regurgitation, 149.
 Jacoby (D. P. A.) on criminal abortion, 538.
 Jacques on scarlet fever, 251.
 Jaundice, 202. See also *Icterus*.
 Johns (S.) on calomel in pruritus ani, 477.
 Johnson and Goodall on blood-serum in insanity, 412, 413.
 Johnston (W. B.) on paratyphoid fever, 24.
 Johnston and Harris on gonorrhreal endocarditis, 148, 352.
 Joints, temperature of, influence of stagnation of circulation upon, 111.
 Jones (E. C.) on secondary anemia, 119.
 Jones (R. L.) on Graves's disease with rheumatoid arthritis, 404; on reflexes in rheumatoid arthritis, 108; on relation between exophthalmic goiter and rheumatoid arthritis, 110; rheumatoid arthritis, 110.
 Jones and Gamgee on nucleic acid of thymus, 624; on optical activity of albuminous substances, 623.
 Jordan on bacteria in river-water, 593.
 Justus test for syphilis, 454.

 KARNOSIN, 620.
 Kelley (S. W.) on dermoid cyst in children, 302.
 Kelly (A. O. J.) on multiple serositis, 145; on myelogenous origin of acute lymphocytic leukemia, 342.
 Keloid, scar, spontaneous, 437.
 Kennedy (R.) on brachial plexus injury at birth, 384.
 Keown (T.) on sodium glycocholate, 497.
 Kerley on diarrhea in children, 268; on bronchopneumonia in children, 274; on diphtheria, 256.
 Kerley and Hughes on diarrhea in children, 268.
 Kernig's sign in children, 298; in typhoid fever, 378.
 Kevin (R. O.) on argyrol in gonorrhea, 472.
 Kidneys, calculus in, treatment, 233;

- cystic degeneration of, 234, 366; diseases of, 215; diseases of, diagnosis, 226; diseases of, diagnosis, phloridzin in, 226; diseases of, diagnosis, urinary cryoscopy in, 227; diseases of, hypertrophy of heart in, 225; diseases of, in children, 291; diseases of, methods of examination, 215; diseases of, treatment, 230; function of, 91; granular, dietetic treatment, 230; in scarlet fever, 252; malpighian bodies of, hyaline degeneration, 366; methylene-blue in determining functioning power of, 227; motility of, in children, as stigma of degeneration, 292; soluble ferments in, 613.
- Kilmer on whooping-cough, 259.
- Kinnicutt on pancreatic lithiasis, 213, 364.
- Kjeldahl method, 620.
- Knapp (M. I.) on *gastrosia fungosa*, 177; on *organacidia gastrica*, 177.
- Kneass and Sailer on *Bacillus subtilis*, 335.
- Knee-jerk in children with croupous pneumonia, 379.
- Knox and Warfield on leukocytes in summer diarrhea, 269.
- Koch (R.) on *frombosia tropica* and *tinea imbricata*, 424; on human and bovine tuberculosis, 29.
- Koplik (H.) on empyema in infants, 276.
- Krautwig on sudden death in infants, 291.
- Krönig's method of diagnosing tuberculosis, 36.
- Kynsey on *Bilharzia haematoxia*, 237.
- LACANANTHES tintoria**, 491.
- Lactic acid in pruritus, 442; in stomach, demonstrating, 173; toxicology, 549.
- Lactophenin in typhoid fever, 24.
- Ladd (M.) on percentage modification of milk, 243.
- Lamp, Finsen, new form, 449.
- Landry's paralysis, 391.
- Lane (W. P.) on medicolegal aspects of necropsies, 532.
- Lang on iodin compounds in syphilis, 459; on electric conductivity of urine, 626; on relation of specific gravity to solids of urine, 631.
- Langerhans, islands of, physiology, 521.
- Langley and Anderson on regeneration of nerve-fibers, 527.
- Lang's hot-air method in lupus, 434.
- Lankford (J. S.) on insanity, 294.
- Larkin on fibroneuroma, 340.
- Lartigau and Nicholl on adenoids, 357.
- Larvas, creeping, in skin of children, 301.
- Laryngeal diphtheria, antitoxin in, 256.
- Larynx and antrum of Highmore, leukemic changes in, 134.
- Laslett on spinocerebellar tract, 527.
- Laslett and Sherrington on spinal reflexes, 527.
- Layton (E. N.) on blood-stains, 564.
- Layton (F. G.) on diachylon poisoning, 542.
- Lead anemia, blood-changes in, 345; in organism, 620.
- Lead-poisoning, 594; in earthenware and china works, 586; nervous system in, changes in, 370; paralysis of limbs from, 594.
- Leak (R. L.) on rupture of heart, 532.
- Lecithin as causing milky ascites, 214; effect of, on erythrocytes, 529; effect of, on growth of rats, 529; in suprarenals, 632.
- Lecithins in heated milk, 622.
- Legal decisions upon medical questions, 537.
- Legal medicine, 530.
- Legat on mushroom poisoning, 545.
- Legislation, English sanitary, for 1902, 596; recent sanitary, 595.
- Leighton on monetary value of human life, 538.
- Leiner (K.) on scarlet fever, 251.
- Lemke on arthritis deformans 284.
- Leprosy, 79, 436; Sudanese, 79.
- Lepromous skin, histologic changes of, 319.
- Lesem and Gies on protagon of brain, 608.
- Leukemia, 132; acute, 135; acute myeloid, 135; etiology, 134; lymphatic, acute, without enlargement of lymph-glands, 342; lymphocytic, acute, myelogenous origin of, 342; miliary tuberculosis complicating, 134; terminating in tuberculosis, 134.
- Leukemic changes in larynx and antrum of Highmore, 134; spleen, products of autolysis of, 620.
- Leukocytes, 124; alterations in, due to infections, 125; clinical value of iodin-reaction with, 126; different varieties of, in various conditions, 125; effects of lymphotoxins and myelotoxins on, 331; Friedländer's apparatus for counting, 115; in blood in children, 279; in diarrhea in children, 269; in malaria, 54; in pneumonia, 59; in pregnancy, 124; in puerperium, 124; in suppuration, 125; influence of heat upon movements of, 124; intracellular glycogen-reaction of, 126; method of counting, 115.
- Leukocytic count in whooping-cough, 259.
- Leukocyogenesis, amphophile, in rabbit, 344.
- Leukocytosis in appendicitis, 198.
- Levene and Stooley on proteid metabolism, 523.
- Levulose, excretion of, in diabetic glycosuria, 87; value of, 244.
- Levulosemia, 87.

- Levulosuria, 87; and glycosuria in diseases of liver, 204; spontaneous, 87.
 Lewis (C. H.) on typhoid fever, 23.
 Libman on infection with *Staphylococcus aureus*, 84.
 Licenses, medical, 569.
 Lichens planus, treatment, 421.
 Lichty (J. A.) on mucous colitis, 195.
 Life, human, monetary value of, 538; insurance, alcohol and, 590.
 Light treatment of lupus, 433; of lupus erythematosus, 494; of lupus vulgaris, 493; of rodent ulcer, 433.
 Limonene, 616.
 Limping, intermittent, 380.
 Lipase in gastric juice, 613.
 Lipemia and cholesterolemia in diabetes mellitus, 609; in diabetes mellitus, 94; traumatic, 118.
 Lipolytic action of blood-serum, 612; action, reversibility of, 613.
 Lithiasis, pancreatic, 213, 364.
 Lithium, 491.
 Liver, abscess of, after typhoid fever, 361; abscess of, bacteria in, 361; acute yellow atrophy of, liver in, 360; adenoma of, 361; angioma of, 361; carcinoma of, uroblin in urine in, 633, 634; cavernoma of, 361; cirrhosis of, 89, 205 (see also *Cirrhosis of liver*); cystic degeneration of, 208; diseases of, 202; diseases of, alimentary levulosuria and glycosuria in, 204; diseases of, examinations of urine and ascitic fluid in, 203; diseases of, general considerations, 203; exclusion of, effect of, on freezing-point of blood, 203; fetal, glycogen in, 618; floating, relation of cardioptosis to, 153; formation of glycogen in, 618; hemorrhagic cirrhosis of, 207; iced, 145; idiopathic congestion of, 359; in acute yellow atrophy of liver, 360; in pernicious anemia, 360; influence of removal, on freezing-point of blood, 335; methods of examination, 202; multiple anemic infarcts of, 359; necrosis, experimental, 360; nucleoprotein of, sugar split from, 622, 623; pericarditic pseudocirrhosis of, 145, 146; stagnation-cirrhosis of, 207; syphilis of, 208.
 Livingstone (A. T.) on ergot, 481.
 Livingstone (G. R.) on belladonna poisoning, 546.
 Lloyd on diabetes mellitus in child, 92, 284.
 Lockard on hydrochloric acid in hay-fever, 493.
 Locke (E. A.) on clinical value of iodine-reaction with leukocytes, 126.
 Locke and Cabot on diastolic heart-murmurs, 144.
 Locomotor ataxia, 385; astereognosis in, 385; depending on inflammation of meninges, 386; etiology of, 387; muscular atrophy in, 385; pupil reaction in, 386; treatment, 411.
 Lodge (F. T.) on personal injury, 535.
 Loeb (J.) on respiratory center, 511.
 Loeb (L.) on mixed tumors of thyroid, 337.
 Loeb (L. M.) on branching forms of bacteria, 323; on two aneurysms in single heart, 352.
 Long on poisoning by corrosives, 560.
 Longcope (W. T.) on bacteriologic serum-complements in disease, 329; on paracolon infection, 26.
 Longridge (C. J. N.) on leukocytosis in appendicitis, 198.
 Lord (P. L.) on habitual use of tobacco in school-boys, 303.
 Lord and Sears on cirrhosis of liver, 206.
 Loth and Engmann on suprarenal extract in skin diseases, 449.
 Lount on child in utero, 537.
 Loving (S.) on subcutaneous emphysema, 32.
 Lowenthal (M.) on conduction in anemic spinal cord, 380.
 Luckett on tetanus antitoxin, 499.
 Lumbar puncture in bronchopneumonia in children, 274; in chronic internal hydrocephalus, 295; in diagnosing meningitis in children, 296.
 Lund (F. B.) on influenza, 72.
 Lung, abscess of, after pneumonia, 60; actinomycosis of, primary, 355; and bronchi, suppurations of, bacteriology, 356; calculus in, 166; carcinoma of, primary, 355; diseases of, simulation of acute peritonitis by, 163; gaseous exchange in, influence of vagus and sympathetic nerves on, 512; glanders of, 355; percussion of, in diagnosis of tuberculosis, 36; syphilis of, 166.
 Lupus erythematosus, etiology, 431; erythematosus, light treatment, 494; erythematosus of face, 431; erythematosus, relation of, to tuberculosis, 430, 431; erythematosus, x-rays in, 431; Finsen light in, 431, 432; Lang's hot-air method in, 434; light treatment, 433; radium in, 434; ultraviolet rays in, 432; vulgaris, Finsen's light in, 493; vulgaris, light treatment, 493; vulgaris, potassium permanganate in, 434, 495; vulgaris, potassium permanganate in, 495; vulgaris, static brush discharge in treatment of, 433; vulgaris, x-rayed, histology of, 433; x-ray in, 431, 432, 439.
 Lusk and Mandel on sugar in phloridzin glycosuria, 520.
 Lusk and Stiles on effect of pancreatic digestion on sugar formation, 609.
 Lycopodium in nocturnal enuresis, 292.
 Lydston (G. F.) on plague, 75.
 Lymph and vasomotor function, 508;

- physiology, 508; vaccine, bacteriologic impurities of, 579.
- Lymphadenitis, tuberculous, of tracheo-bronchial glands, 35.
- Lymphangiomas, formation and growth, 338.
- Lymphatic apparatus of intestine, relation of, to absorption, 517; apparatus, tuberculosis of, 35; apparatus, tuberculosis of, 306; leukemia without enlargement of lymph-glands, 342.
- Lymph-glands, autolysis of, products of, 620.
- Lymphocytes, ability of, to migrate, 345.
- Lymphocytic leukemia, acute, myelogenous origin of, 342.
- Lymphoid cells in production of blood, 132; tissue, pharyngeal, hyperplasia of, 357.
- Lymphoma, malignant, and tuberculosis, 36.
- Lymphotoxic and myelotoxic intoxication, 330.
- Lymphotoxins and myelotoxins, effects of, on leukocytes, 331.
- Lysin, 603.
- Lysoform, 491.
- Lysol, poisoning by, 558.
- MABRY and Gemmill on cholera, 77.
- MacCallum (W. G.) on glands of lung, 355; on multiple hemorrhagic infarctions of lung, 356.
- MacConkey on mammary abscess in typhoid fever, 18.
- MacGregor (W.) on malaria, 49.
- MacKaig on insects and cholera, 77.
- MacLennan on ethyl chlorid anesthesia, 484.
- MacLeod on histology of x -rayed lupus vulgaris, 433.
- Macfadyen on antityphoid serum, 471.
- Mackenzie on iodipin in uterine fibroid, 490.
- Mackensie (D. H.) on epidemic of acute nervous disease, 296.
- Mackenzie (J.) on polygraph, 140.
- Mackintosh (O. J.) on lupus, 432.
- Macleod and Hill on compressed and rarefied air, 512.
- Madison (J. D.) on tuberculin in tuberculosis, 37.
- Magill (W. S.) on criminal poisoning by aconite, 545.
- Magnesium peroxid, 492; sulfate, 492; sulfate in dysentery, 492; toxicology, 549.
- Malaria, 47; and carcinoma, relation between, 49; and culicides, relation of, 48; and hemoglobinuric fever, 50, 51; arrhenal in, 56; complications, 50; diagnosis, 52; diagnosis, microscopic, 52; environment as cause, 47; erythrocytes in, 54; etiology, 47; hemorrhages in, cachexia as cause, 50; hospital epidemic of, 48; in Cyprus, 47; in Germany, 48, 49; in India, 49; in Italy, vital statistics, 597; in Manhattan Island, 48; leukocytes in, 54; melanism in, 52; methylene-blue in, 55, 492; prevention of, 581; prophylaxis, 55; quinin in, 55, 495; quinin in, hemoglobinuria from, 51; red and white cells in, 54; soda methylarsenate in, 56; symptomatology, 47; tertian, 50; treatment, 55; typhoidal, 49.
- Malarial hemoglobinuria and unciniariasis, 52; organisms, staining of, 53; origin of herpes zoster, 325; parasite, flagellums of, as fertilizing elements, 54.
- Malformation of tricuspid leaflets, 354.
- Malformations, congenital, in children, defective coordination in utero as factor in causation, 266.
- Malignant disease, relation of angiomas of skin to, 436; x -rays in, 503.
- Malingering, 539.
- Mall (F. B.) on estimating age of embryo, 536.
- Malpighian bodies of kidney, hyaline degeneration, 366.
- Malpractice, 568.
- Malta fever, 78; in United States army, 78.
- Mammary abscess in typhoid fever, 18.
- Mammritis, infectious, in cow, 242.
- Manahan (T. J.) on fibrinous exudate in septic peritonitis, 325.
- Mandel and Jackson on source of glucuronic acid, 617.
- Mandel and Lusk on sugar in phloridzin glycosuria, 520.
- Manges (M.) on collargol in ulcerative endocarditis, 149.
- Manson (P.) on bilharzia disease, 237; on prevention of malaria, 581; on trypanosomiasis, 238.
- Mantle (A.) on angioma of liver, 361.
- Marasmus; relation of thymus gland to, 348.
- Marrow, bone-, action of arsenic on, 347.
- Marsden on fourth disease, 258.
- Marshall on carbolic acid poisoning, 558.
- Martin on flies in cause of typhoid fever and summer diarrhea, 580.
- Martin (E.) on adrenalin, 463.
- Martin (E. D.) spinal cocainization, 479.
- Marvel (E.) on ethyl bromid anesthesia, 483.
- Mason (C. F.) on Dhobie itch, 423.
- Massage, effect of, on blood-corpuscles, 118; in rheumatism, 68.
- Mastitis, chronic cystic, 373.
- Mastoiditis, diplococeus in, 321.
- Materia medica, 461.
- Maternal secretion, neglect of, 241.

- Mathews (A. P.) on electric nerve-activity, 526.
 Mattison (J. B.) on hyoscine treatment of morphin habit, 556.
 Maude (A.) on revaccination, 71.
 Maul (J. P.) on congenital absence of esophagus, 357.
 Maxwell-Adams on trypanosomiasis and sleeping-sickness, 80.
 Mayer (E.) on hay-fever antitoxin, 487.
 McAlister (A.) on infant morbidity, 243.
 McCarthy (D. J.) on formation of hemolymph glands from adipose tissue, 341; on paralysis of arms, 567.
 McCarthy and Davission on transverse myelitis in newborn, 298, 389.
 McCarthy and Dercum on adiposis dolorosa, 372.
 McCarthy and Ravenel on epidemic cerebrospinal meningitis of horses, 323; on rabies, 323.
 McCaskey (G. W.) on electric reactions of gastrointestinal musculature, 178; on tuberculosis of bronchial glands, 35.
 McCaw (J. F.) on epithelioma of uvula and soft palate, 357.
 McCollom (J. H.) on measles, 258.
 McCrae (T.) on typhoid fever with trichinosis and eosinophilia, 18.
 McDonald (J. T.) on leprosy, 436.
 McEwen and Hyde on dermatoses in exophthalmic goiter, 404, 443.
 McFarland on tetanus following vaccination in children, 264.
 McKee on diarrhea in children, 268.
 McKibben and Comey on chylous ascites, 214.
 McRae (F. W.) on abscess of lung after pneumonia, 60.
 Measles, 258; and scarlatina, rubella followed by, 258; complications of nervous system following, 258; scarlatina following, 252.
 Meat, digestion of, 609.
 Mediastinopericarditis, adhesive, 146.
 Medical education, 569; ethics, 568; licenses, 569; questions, legal decisions on, 537.
 Medulla and spinal cords, changes in, in pernicious anemia, 131; and pons, softening of, 396.
 Meech on carbolic acid in variola, 72.
 Meigs (A. V.) on infant-feeding, 245.
 Melanism in malaria, 52.
 Melanuria, 218.
 Melena neonatorum, 279.
 Melland on leukocytes in malaria, 54.
 Meltzer (S. J.) on abnormalities in iliac fossa, 197.
 Meltzer and Salant on influence of nephrectomy on absorption, 365.
 Memory, loss of, prolonged, 567.
 Mendel, Underhill, and White on nucleic acid from wheat embryo, 622.
 Mendel and Underhill on proteoses, 627.
 Meninges, cerebral, diseases of, 392; inflammation of, tabes depending on, 386; spinal, diseases of, 382.
 Meningitis, 392; cerebrospinal, epidemic, of horses, 323; in breast-fed infants, 258; in children, diagnosis, lumbar puncture in, 296; influenzal, 73; suppurative, in newborn, 295; suppurative, influenza and, 258; tuberculous, and typhoid fever, 19; tuberculous, in children, 295.
 Meningococcus septicemia, 85.
 Menstrual psychoses, 414.
 Mental conditions, medicolegal aspects, 567; diseases, 377, 411; diseases, chloralose in, 478; diseases, glycosuria in, 88; function, prefrontal lobes and, 413; symptoms in heart disease, 413.
 Mercurial stomatitis, hydrogen dioxid in, 488.
 Mercuric chlorid in syphilis, 456, 459; poisoning, 560.
 Mercurol, 492.
 Mereury acetamid in syphilis, 458; biniodid in syphilis, 459; biniodid, oily solution of, gangrene after injection of, 443; cyanid, 492; cyanid in syphilis, 456; ethylene-diamin compound of, sublamin and, toxicology, 559; in syphilis, 455, 456, 457; in syphilis, massive doses, 458; sallycylate in syphilis, 457.
 Merriam and Wheeler on pseudothioura, 629.
 Merrill on morphin poisoning, 555.
 Merrins (E. M.) on Heberden's nodes, 110.
 Mesenteric artery, superior, embolism of, 161.
 Mesotan, 492.
 Metabolic affection, 112.
 Metabolism, alcohol, 523; diseases of, 86; effect of alcohol on, 465; glycogen, 522; in chronic nephritis, 230; in diabetes insipidus, 101; in tuberculosis, 31, 32, 44; nitrogen, 524; nitrogen, effect of ether on, 482, 483; nitrogen, in pernicious anemia, 128; physiologic chemistry, 620; physiology, 523; protein, 523, 620; protein, in pernicious anemia, 621; respiratory, 524; resting, diminution of, after castration, 523; sodium chlorid, 524.
 Metals, different, hygienic importance of, in household, 594.
 Metaplasia, 338.
 Meteorism, physostigmin in, 494.
 Methemoglobinemia, 119, 120.
 Methyl alcohol, toxicity of, 551.
 Methylidioxypyrimidin, 628.
 Methylene-blue, 492; in determining

- functionating power of kidneys, 227; in malaria, 55, 492; in tropical dysentery, 197; in tuberculosis, 492.
- Mett's method of determining pepsin in stomach-contents, 174.
- Meyer (A.) on obstruction of *venæ cavæ*, 162; on pathology of epilepsy, 410.
- Micromelia in children, 290.
- Migraine, ophthalmoplegic, 380.
- Miles and Muhlberg on adrenalin, 464.
- Milium, treatment, 443.
- Milk and infant-feeding, 241; and tuberculosis, 589; asses', 243; ferruginous, 242; heated, diminution of lecithins in, 622; hydrogen dioxid in, detection of, 621; hygiene, prizes for, 590; idiosyncrasy in infants, 244; in typhoid fever, 22; pasteurized or sterilized, scurvy or rickets from, 244; percentage modification of, 243; purification of, by centrifugal separation, 590; soluble ferments in, 242; sterilized, as infant food, 246; trade, hygienic requirements in, 588.
- Milk-poisoning in children, 268.
- Milky ascites, lecithin as causing, 214.
- Millard on scarlet fever, 251.
- Miller (D. J. M.) on pneumonia, 60.
- Miller (G. B.) on postoperative pleurisy, 167.
- Miller and Edsall on akromegaly, 111, 406; on nourishment by rectum, 200; on rectal absorption, 200, 630.
- Mills and Spiller on hemiplegia, 394.
- Milward on picric acid in skin diseases, 494.
- Mineral-water, hyperisotonic and hypotonic, influence of, on blood-pressure, 141.
- Miners, gold, consumption in, 586; uncinariasis in, 586.
- Mitchell (E. W.) on amygdalitis in children, 264; on hardening process in children, 302.
- Mitral stenosis, paralysis of recurrent nerve in, 149; pregnancy and, 150.
- Monogolism in children, 290.
- Monoplegia, brachial, in children, in course of chorea minor, 299.
- Montgomery, Ryfkogel, and Morrow on dermatitis coccidioides, 426.
- Moody on morphin habit, 556.
- Mooers on gas-cavities in brain, 395.
- Moore on tertian malaria, 50.
- Moore (J.) on quinin in rheumatism, 496.
- Moore (J. T.) on flagellums of malarial parasites, 54; on strongylus, 236.
- Moore and Allison on malaria, 55; on methylene-blue, 492.
- Moras on immunity in rheumatism, 66.
- Morgan (D.) on lupus and skin cancer, 440.
- Morphin, 493; habit, camphor in, 477, 555; habit, home treatment, 556; habit, hyoscine treatment, 488, 489, 556; habit, withdrawing morphin immediately in, 556; in uremic convulsions, 493; influence of, upon secretion of gastric juice, 178; poisoning, acute, spinal symptoms in, 555; poisoning in infants, 555; poisoning, salt solution in, 555; poisoning, serum for, 554.
- Morris on gallstone simulating carcinoma, 210.
- Morris and Dore on *x*-rays in skin diseases, 432.
- Morrison (A.) on cardiac pain, 156.
- Morse (J. L.) on chondrodystrophia foetalis, 288; on splenic enlargement, 281; on cirrhosis of liver, in childhood, 271; on diarrhea in children, 267, 269; on infant-feeding 241; on typhoid fever in infant, 248.
- Moser's serum in scarlet fever, 252, 253.
- Mosquitos, destruction of, 581; vessels as carriers of, 581.
- Mosso on carbon monoxid, 595.
- Motor neuroses, 406.
- Mott (F. W.) on syphilis as cause of general paralysis, 454; on vascular and glia changes in relation to neuron degeneration, 368.
- Mouth and throat, diseases of, 170.
- Mouth-breathing of children, 273.
- Mucin in ascitic fluid, 622.
- Mucous colitis, etiology, 195.
- Muhlberg and Miles on adrenalin, 464.
- Mullings and Shrubsall on tuberculosis of esophagus, 357.
- Mumps, renal symptoms after, 225.
- Murdoch on orthoform in diagnosis of gastric ulcer, 186.
- Murray (F. A. G.) on typhoid fever, 18.
- Murray (G. R.) on exophthalmic goiter, 105.
- Murrell (W.) on leukemia, 134.
- Muscle-plasma, coagulation, 622.
- Muscle-proteids, coagulation of, rigor mortis from, 622.
- Muscles, bronchial, physiology, 512; physiology, 525.
- Muscular atrophy in tabes, 385; tissue in acute primary polymyositis, pathology, 373.
- Mushroom poisoning, 545.
- Musser on carcinoma of lung, 355.
- Myasthenia gravis, 381; and angioneurotic edema, 381; pathology and bacteriology, 368.
- Mydriasis, springing, 159.
- Myelitis, 389; diffuse, with double optic neuritis, 390; due to hydatid cysts, 390; transverse, in newborn infant, 298, 389.
- Myelocene in psoriasis, 420.
- Myogenous origin of acute lymphocytic leukemia, 342.
- Myeloid function of spleen, 133.

- Myeloma, multiple, associated with Bence-Jones albumosuria, 220.
 Myelotoxic and lymphotoxic intoxication, 330.
 Myelotoxins and lymphotoxins, effects of, on leukocytes, 331.
 Myers (C. S.) on myasthenia gravis, 368.
 Myocardial alterations and rheumatic poison, 353.
 Myocarditis, 151; in children, 278; in rheumatism, 67; rheumatic, 353; segmentary, 151; traumatic, 147.
 Myocardium, tuberculosis of, 34.
 Myoclonus, 407.
 Myxedema, congenital, myxedema, infantile, and endemic cretinism, differentiation, 289; in children, 290.
 Myxedematous idiocy, 290.
 Myxococcidium stegomyiae, 316.
- NAFTALAN** in eczema, 417.
 Nails, tinea of, in Iceland, 424.
 Nammack on typhoid gangrene, 18.
 Naphthalene poisoning, 542.
 Naptha vapor, poisoning with, 542.
 Narcosis, alimentary glycosuria after, 521.
 Nasal diphtheria, primary, 255; taste, 528.
 Nash on oysters and typhoid fever, 574.
 Nash (G.) on sore-throat from milk, 171.
 Nash (L. F.) on naphthalene poisoning, 542.
 Neck, tuberculous glands of, suppuration, 307.
 Necropsies, medicolegal aspects, 532.
 Necrosis, fat, experimental, 374; fat, relation of trauma to, 213; liver, experimental, 360.
 Negro, criminal aspect of, 562; influence of, on white race, 562.
 Nematoda, 234.
 Nephrectomy, influence of, on absorption, 365.
 Nephritis, 225; acute syphilitic, 225; dietetic treatment, 231; diffuse productive, Banti's disease with, 358; in smallpox, 70; metabolism in, 230; nitrogen-retention in, 230; pericarditis as terminal infection in, 226.
 Nerve-activity, electric theories of, 525, 526; nature of, 525.
 Nerve-fibers, regeneration of, 527.
 Nerves, cranial, diseases of, 392; of heart, physiology, 509; of lower extremities, multiple fibroma of, 340; physiology, 525; spinal, diseases of, 382.
 Nervous diseases, 377; diseases, acute, in children, epidemic of, 296; diseases, arterial sclerosis as cause, 381; diseases, ergot in, 481; diseases in children, 293; diseases, paradoxical reac-
- tion of pupil for accommodation in, 378; shock, psoriasis after, 419; system, central, actinomycosis of, 369; system, central, changes in, in chronic alcoholism, 383; system, central, sarcomatosis of, multiple, 398; system, complications of, following measles, 258; system, diseases of, in children, 293; system in lead-poisoning, changes in, 370; system, pathologic changes in, from rabies, 324; system, pathology and bacteriology, 368; system, physiology, 527.
 Nervousness in children, 293.
 Neurasthenia, alteration in pulse as phenomenon of, 154; in children, 294.
 Neuritis, arsenical, hemoglobin in, 552; double optic, diffuse myelitis with, 390; multiple, dilation of duodenum in, 182; multiple, from sulfonal, 382; peripheral, 382; peripheral, in whooping-cough, 383.
 Neurofibromatosis, 384.
 Neuromas, multiple, 384.
 Neuron degeneration, vascular and glia changes in relation to, 368.
 Neuroses due to infection, 402; motor, 406.
 Neurotic children, 293.
 Newborn on cultures of achorion Schoenleinii and trichophyton fungus, 423.
 Newsholme on epidemic diarrhea, 580.
 Nicholl and Lartigau on adenoids, 357.
 Nichols (J. B.) on acute leukemia, 135.
 Nicholson (F.) on spinal rheumatism, 66.
 Nickel-carbonyl poisoning, 542.
 Nipple, Paget's disease of, 437.
 Nitrate, toxicology, 549.
 Nitrites, existence of, in drinking-water, 591.
 Nitrogen-excretion in pneumonia, 59.
 Nitrogen-metabolism in pernicious anemia, 128.
 Nitrogenous substances in urine, 204.
 Nitrogen-retention in chronic nephritis, 230.
 Nitrohydrochloric acid, 493; in hay-fever, 493.
 Nodes, Heberden's, 110.
 Noguchi on immunization hemolysins, agglutinins, precipitins, and coagulins in cold-blooded animals, 328; on interaction of blood of cold-blooded animals, 329, 330; on multiplicity of serum hemagglutinins of cold-blooded animals, 332.
 Noguchi and Flexner on cytolysins in normal blood-serums, 328.
 Noma, 264.
 Norris (G. W.) on tetanus, 403.
 Norton (C. F.) on heat in itching of ivy-poisoning, 420.
 Nucleic acids from wheat embryo, 622; isolation of, method for, 622; physiologic chemistry, 622; thymus, 624.

- Nucleoprotein of liver, sugar split from, 622, 623.
- Nutrition, diseases of, in children, 284; intestinal bacteria in, 190.
- Nuttall and Shipley on Anopheles, 581.
- O**BESITY, cure of, 114; sodium borate in, 114.
- Obstipation, spastic, 193.
- Occiput, primary actinomycosis of, 423.
- Occupation and tuberculosis, relation between, 31; dangerous, file-making as, 587.
- O'Connell (M. D.) on ague, 47.
- Ogilvie (G.) on parasyphilis, 453.
- Ogle on antistreptococcus serum in malignant endocarditis, 469.
- Ohmann-Dumesnil on tattoo marks, 429.
- Oil of pennyroyal, poisoning with, 543, 544.
- Olive oil, 493; in gastric hyperacidity, 493; in gastric ulcer, 187.
- Oliver on gold miner's consumption, 586; on poisoning by sulfuretted hydrogen, 543; on tumor of brain, 400.
- O'Malley (J.) on diphtheria antitoxin in bronchopneumonia, 274, 370.
- Ophthalmoplegic migraine, 380.
- Opium habit, 555; poisoning, acute, 554; poisoning, treatment, 554.
- Optic neuritis, double, diffuse myelitis with, 390.
- Optical activity of albuminous substances, 623.
- Organacidia gastrica, 177.
- Organic acids, toxicology, 549.
- Orthoform in diagnosis of gastric ulcer, 186.
- Osazone, 624.
- Osborne on triticonucleic acid, 624.
- Osborne and Harris on carbohydrate group in protein molecule, 608; on triticonucleic acid, 623.
- Osler (W.) on splenic anemia, 138.
- Ossification, premature, of fontanelles and sutures, 297.
- Osteitis deformans and hyperostosis cranii, 372.
- Osteoarthropathy and club-fingers, relation between, 113; etiology, 112.
- Osteochondritis, specific, in children, 262.
- Osteochondrosarcoma of thyroid, 337.
- Osteomyelitis, acute, in infancy, 263.
- Osteopathy, medicolegal aspects, 569.
- Ostheimer on diarrhea in children, 269; on nodule in child of syphilitic parentage, 262.
- Ostheimer and Griffith on typhoid fever in children, 249.
- Ott and Harris on adrenalin, 463.
- Ovary, fibroma of, 339.
- Oxalic acid poisoning, 543; toxicology, 549.
- Oxaluria, 218.
- Oxyamido acid, new, 604.
- Oxygen capacity of hemoglobin, 618; infusions, intravenous, in respiratory diseases, 165.
- Oxyhemoglobin, hydrolytic products, 604; as material for investigation of protein decomposition products, 604, 606.
- Oxyuris, 236; vermicularis, appendicitis from, 236.
- Oysters and sewage, 591; and typhoid fever, 574.
- Ozone in destruction of pathogenic germs in water, 591.
- P**ACKARD (M. S.) encapsulated diplococcus in mastoiditis, 321.
- Packard and Willson on tetanus antitoxin, 498.
- Page's disease of nipple, 437.
- Paine on apocynum cannabinum, 472.
- Paine and Poynton on arthritis, 64.
- Painter (C. F.) on infantile paralysis, 297; on poliomyelitis, 391.
- Paints, wall, disinfecting, effect of, on tubercle bacilli, 583, 584.
- Palate, soft, uvula and, primary epithelioma of, 357.
- Pancreas, diseases of, 212; in cirrhosis of liver, 89, 363; in diabetes mellitus, 94; relation of changes in, to diabetes mellitus, 362.
- Pancreatic and dead yeast-cells, auto-digestion of, protein decomposition products from, 611; diabetes with icterus gravis, 95; digestion, end-products of, effect on sugar formation, 609; ferments, precipitability of, by alcohol, 614; juice, trypsinogen of, 515; lithiasis, 213, 364; secretion, 212; secretion, excitation of, by acid in intestine, 514, 515.
- Pancreatitis, chronic interstitial, 363.
- Paracolon infection, 26.
- Paradoxic pulse, 147.
- Paralysis, facial, 392; general, syphilis as cause, 454; in children, epidemic of, 297; Landry's, 391; motor, of cerebral origin, sensations in, 394; of arms, medicolegal tests in, 567; of limbs from lead-poisoning, 594; tabetic general, spontaneous remission of, 411.
- Paramyoclonus multiplex, 406.
- Parasite, alleged, of yellow fever, 316; malarial, flagellums of, as fertilizing elements, 54; of rat in transmission of plague, 582; supposed, of smallpox, 312.
- Parasites, 234.
- Parasitic hematuria, 327.

- Parasyphilis, 453.
 Parasyphilitic and syphilitic changes, coexistence of, 453.
 Paratyphoid fever, 24.
 Paresis, general, treatment, 411.
 Paretic dementia, 411; treatment, 411.
 Park (R.) on *x*-rays in malignant disease, 503.
 Park and Carey on epidemic dysentery, 310.
 Parke (T. D.) on ileocolitis, 269.
 Parker (G.) on pneumococcus infection, 61.
 Parker, Beyer, and Pothier on yellow fever, 315.
 Parotiditis in children, guaiacol in, 264.
 Paroxysmal hemoglobinuria, 219.
 Parry on calcium chlorid in hemophilia, 280.
 Patek (A. J.) on albuminous expectoration after thoracocentesis, 169.
 Patek and Bennett on differentiating human blood, 334, 564.
 Pathology and bacteriology, 304.
 Paton on adrenalin glycosuria, 520.
 Patrick on nervousness in children, 293.
 Patterson on estivo-autumnal fever, 48.
 Paul and Walton on Achilles jerk, 378.
 Pavly, Brodie, and Siam on phloridzin glycosuria, 626.
 Pearce (F. S.) on antipyrin, 468.
 Pearson (S. V.) on urea in tuberculosis, 502.
 Pearson and Gilliland on immunizing cattle against tuberculosis, 42.
 Pectoral muscle, congenital defect of, 164.
 Pediatrics, 240.
 Pellagra, ankylostomiasis with symptoms of, 235.
 Pemphigus, acute malignant, 422.
 Pennyroyal, oil of, poisoning with, 544.
 Pentoses, relation of, to physiologic chemistry, 625.
 Pentosuria, 86; pure, 86.
 Pepsin in stomach-contents, determining of, 174.
 Peptic proteolysis, 625.
 Peptone and albumoses precipitins, formation of, 627.
 Peptozyme, 627.
 Perforation of gallbladder, 211.
 Peribronchitis and interstitial pneumonia in children, 275.
 Pericarditic pseudocirrhosis of liver, 145, 146.
 Pericarditis, 145; as terminal infection in Bright's disease, 226; chronic obliterative, associated with ascites, 145; traumatic, 147; tuberculous, 147.
 Pericardium, adherent, in children, 277.
 Peripheral neuritis, 382; in whooping-cough, 383.
 Peritoneal cavity, milky nonfatty effusions in, 214.
- Peritoneum, diseases of, 213.
 Peritonitis, acute, simulation of, by diseases of lung, 163; in typhoid fever, 15; perforation, 213; pneumococcic, 63; pneumococcic, in children, 270; septic fibrinous exudate in, bacteriology, 325; tuberculous, 33; tuberculous, in children, 261; tuberculous, in children, prognosis, 261; tuberculous, in children, treatment, medical, 261; tuberculous, prognosis and treatment, 46.
 Perkins and Howard on granular eosinophiles in tissues, 375.
 Perkins and Poy on blood-serum in variola, 313; on relation of streptococcus pyogenes to variola, 313.
 Pernet on tinea of nails in Iceland, 424; on histology of *x*-rayed lupus vulgaris, 433.
 Pernicious anemia, 128; and achylia gastrica, relation between, 131; and Biermer's anemia, differentiation, 129; and digestive tract, relation between, 130, 131; changes in spinal cord and medulla in, 131; from Bothrioccephalus latus, 237; liver in, 360; nature, 130; nature and etiology, 129; nitrogen metabolism in, 129; pathology, 130, 341; protein metabolism in, 621; resistance of erythrocytes in, 122.
 Perry (A. W.) on gastric dilation, 184; on hydrochloric acid for gastric disease, 179.
 Petroleum and tar in suppression of dust, 600.
 Petty (G. E.) on heroin habit, 556.
 Pfahler (G. E.) on *x*-rays in skin cancer, 438.
 Pharmacology, 461.
 Pharyngeal lymphoid tissue, hyperplasia of, 357.
 Phenolphthalein as a purgative, 201.
 Philip (R. W.) on tuberculosis, 36.
 Phloridzin glycosuria, 90, 519, 626; source of sugar in, 520; in diagnosis of renal disease, 226.
 Phosphate, toxicology, 549.
 Phosphates in drinking-water, 592.
 Phosphaturia, 218.
 Phosphorus compounds, physiologic chemistry, 626; in blood, determining, 116.
 Phototherapy, 493.
 Phrenic nerves, physiology, 512.
 Physiologic chemistry, 601.
 Physiology, 506.
 Physostigmin, 494; in meteorism, 494.
 Picric acid, 494; in skin diseases, 494.
 Piffard on Röntgen and ultra-violet rays, 445.
 Pighini on articular amyotrophy, 382.
 Pigment, urinary, measurement of, 216.
 Pigments, bile-, Huppert's test for, modification of, 608.

- Pilocarpin in pneumonia, 61; in scarlet fever, 253.
- Pineal gland, physiology, 522.
- Piperidin tartrate, 494.
- Plague, 75; arrhenal in, 76; cultures from blood of, 75; destruction of rats for prevention of, 582; Haffkine's prophylactic in, 76, 487; parasites of rat in transmission of, 582; rats in spread of, 75; serum reaction of *Bacillus pestis* in, 335; treatment, 76; Yersin's serum in, 467.
- Plasma-cell question, status of, 374.
- Plasmatic anemia, 117.
- Pleasant (J. H.) on traumatic pericarditis, 147.
- Pleurisy, 167; biliary, 168; hemoptysis as sign of, 167; in typhoid fever, 17; percussion-sign of, 167; postoperative, relation of, to pulmonary embolism, 167; productive tuberculous, 33; sterilized air in, 169; symptoms of peritonitis and occlusion of intestine in, 164; treatment of, with effusion, 169; with pneumonic induration, 33.
- Plexus, brachial, injury of, at birth, 384.
- Plumbism, acute, in children, 303.
- Pneumococcic arthritis, 62, 63, 319; peritonitis, 63; peritonitis in children, 270; septicemia, 61; septicemia, epidemic, 62.
- Pneumomycosis aspergillina, 355.
- Pneumonia, 56; abscess of lung after, 60; algid, 59; antipneumococcus serum in, 468; bacteria in, 57; calomel in, 476; complicating stagnation in lesser circulation, 57; complications, 60; creasote in, 61; croupous, antitryptic action of blood-serum in, 58; croupous, in children, 273; croupous, in children, knee-jerk in, 379; croupous, prognosis and treatment, 60; endocarditis in, 60; ergot in, 481; femoral thrombosis in, 60; in altitude, 59; increasing prevalence of, 56; interstitial, and peribronchitis, in children, 275; leukocytes in, 59; lobar and unresolved, autolysis in, 354; lobar, in children, 273; lobar, simulating appendicitis in child, 273; nitrogen-excretion in, 59; pilocarpin in, 61; quinin in, 61; treatment, 60, 61; urine in, 58.
- Pneumonic exudates, fats of, 354.
- Pneumothorax, spontaneous nontuberculous, 169, 316.
- Poisoning, acetanilid, 120, 462; alcoholic, acute, 551; arsenical, ferric hydroxid in, 552; bromoform, 475, 544; by aconite, criminal, 545; by antiseptic, 557; by belladonna, 546; by corrosives, 560; by lysol, 558; by oil of pennyroyal, 544; by potassium chloride, 550; by quinin, 544, 545; by sulfuretted hydrogen, 543; by tartar
- emetic, 554; carbolic acid, 558; carbolic acid, artificial respiration in, 559; carbolic acid, in children, 557; chlorodyne, 544; colchicin, 547; diachylon, 542; forage-, pathology, 323; formalin, 550; heroin, 557; ivy-, ichthyol in, 550; ivy-, itching of, heat in, 420; lead-, 594; lead-, in earthenware and china works, 586; lead-, nervous system in, changes in, 370; lead-, paralytic of limbs from, 594; mercuric chlorid, 559; milk-, in children, 268; morphin, acute, spinal symptoms in, 555; morphin, in infants, 555; morphin, salt solution in, 555; morphin, serum for, 554; mushroom, 545; naphthalene, 542; nickel-carbonyl, 542; opium, acute, 554; opium, acute, treatment, 554; oxalic acid, 543; strychnin, 550; sulfite, chronic, 593; trional, 501; trional, 543; with naphtha vapor, 542.
- Poisons in relation to public health, 593.
- Polioencephalitis inferior, pathology, 370.
- Poliomyelitis, 391; acute, and encephalitis in children, 296; epidemic of, 391.
- Pollution, soil, relation to endemic conditions, 592.
- Polyarthritis in children, 283.
- Polycythemia, chronic cyanotic, 117.
- Polymyositis, acute primary, muscular tissue in, pathology, 373; hemorrhagic 114.
- Polyneuritis in child, 259.
- Pons and medulla, softening of, 396.
- Pope (F. M.) on Fowler's solution in chorea, 473.
- Potassium chlorate, poisoning by, 550; iodid, 495; ion, toxicology, 549; permanganate, 495; permanganate in lupus vulgaris, 434, 495.
- Pottenger (F. M.) on tuberculin, 501.
- Potts (C. S.) on atropin in spasmoid torticollis, 474; on exophthalmic goiter, 107; on strychnin in tie douloureux, 498.
- Powell (A. F. M.) on formalin in cancer, 485.
- Poynton (F. J.) on myocardial alterations and rheumatic poison, 353.
- Poynton and Paine on arthritis, 64.
- Pratt (J. H.) on paratyphoid fever, 25.
- Precipitin for urine, 627; reactions, 627; test for blood, 627.
- Precipitins, albumoses and peptone, formation of, 627; immunization, in cold-blooded animals, 328.
- Pregnancy, chorea of, 403; in mitral stenosis, 150; leukocytes in, 124.
- Preventive medicine, 571.
- Price (N. G.) on heroin in diseases of children, 303.
- Pridmore (W. G.) on dengue, 79.

- Prince (L. A.) on *x-ray dermatitis*, 426.
 Prince (M.) on *osteitis deformans* and *hyperostosis crani*, 372.
 Pringle on endemicity of infectious diseases, 592.
 Prostatic enlargement, etiology and pathology, 367.
 Protagon of brain, 608.
 Proteid decomposition products from autodigestion of dead yeast-cells and pancreatic cells, 611; decomposition products, oxyhemoglobin as material for investigation of, 604, 606; metabolism, 523, 620; metabolism in pernicious anemia, 621; metabolism, influence of alcohol on, 621; molecule, carbohydrate group in, 608.
 Proteids, constitution of, 603; in body-fluids, analyses of, 607; iodin-, binding group in, 619; muscle-, coagulation of, rigor mortis from, 622.
 Proteinochrom, 606.
 Proteolysis, peptic, 625.
 Proteolytic enzymes, 333; of urine, origin, 614.
 Proteoses, physiologic chemistry, 627.
 Protozoa in digestive tube, 359.
 Prout and Clark on epilepsy, 407.
 Prurigo of Hebra, treatment, 420.
 Pruritus, acids internally in, 442; and fissures of anus, 442; ani, calomel in, 477; lactic acid in, 442; with jaundice, thyroid extract in, 442.
 Pseudoleukemia, 343, 344.
 Pseudomembranous angina, 254; inflammation, 255.
 Pseudotetanus in diphtheria, 257.
 Pseudotubercle bacilli in man, 306; infection with, 39.
 Psoriasis after nervous shock, 419; after vaccination, 419; chrysophanic acid in, 419; myelocene in, 420; thyroid extract in, 419; treatment, 419.
 Psychic gastric juice, 628.
 Psychoneuroses, 407.
 Psychoses in children, 294; menstrual, 414.
 Public hygiene, 571.
 Puerperium, leukocytes in, 124.
 Pugh (R.) on blood in epilepsy, 408.
 Pulmonary insufficiency, temporary, 150; stenosis, congenital, 150.
 Pulse, alteration in, as phenomenon of neurasthenia, 154; paradoxie, 147.
 Pulsus alternans, 153; myurus, 153.
 Puncture, lumbar, in chronic internal hydrocephalus, 295; lumbar, in diagnosing meningitis in children, 296; of spleen, diagnosis of typhoid fever by, 21.
 Punton (J.) on criminal responsibility of epileptic, 561.
 Pupil, paradoxical reaction of, for accommodation, in nervous diseases, 378; reaction in tabes, 386.
 Pupils, importance of differences in, 159; inequality of, in thoracic aneurysm, 158.
 Purin bases and uric acid, origin of, 628; ring, 628.
 Purin-bodies in feces, 104.
 Purinometer, 104.
 Purpura, 137; angioneurotic, 137; in children, gelatin in, 280; rheumatica in children, 280.
 Putnam, Strauss, and Park on sarcoma of spinal cord, 389.
 Putrefaction, intestinal, 192.
 Psychotherapy, 490.
 Pyemia from suppurative cholecystitis, 210; streptothrix, 86.
 Pylorus, palpation of, 180; stenosis of, 180; stenosis of, biliary origin, 181; stenosis of, congenital, in children, 265, 266; stenosis of, hypertrophic in infant, 265, 266.
 Pypneumothorax, 170.
 Pyramidon, 495; in typhoid fever, 23, 495.
 Pyramum, 495.
 Pyrimidin derivatives, physiologic chemistry, 628; ring, 628.

 QUINIC acid in gout, 105.
 Quinin, 495; in malaria, 55, 495; in pneumonia, 61; in rheumatism, 496; poisoning by, 544, 545.

 RABIES, 82; diagnosis of, histologic, 324; diagnosis of, rapid, 323; microscopic lesions found in, 323; pathologic change produced in nervous system by, 324; rarity of, in Constantinople, 575.
 Rachford and Crane on ammonium compounds, 548.
 Rachitis, late, 113.
 Radasch on ectopic adrenals, 350.
 Radiography in gallstones, 209.
 Radius, 496; in lupus, 434; in skin diseases, 496; influence of, on growth of animal tissue, 630; rays, 529; rays, bactericidal action, 630; salts, action of, on globulin, 629.
 Rales, causation of, 163.
 Rankin (G.) on gelatin in aortic aneurysm, 487.
 Rats, destruction of, for prevention of plague, 582; parasites of, in transmission of plague, 582.
 Raubenheimer on carbolic acid poisoning, 557.
 Ravenel (M. P.) on relation of human and bovine tuberculosis, 27.
 Ravenel and McCarthy on epidemic cerebrospinal meningitis of horses, 323; on rabies, 323.

- Raw (N.) on pneumococcic infection, 62.
 Read (A. C.) on xanthelasmaidea in adult, 416.
 Reagh and Smith on agglutinins acting on flagellums and bacteria, 333.
 Re-alimentation, 524.
 Rectal absorption, 630; enemas, use of, 201.
 Rectum, nourishment by, 200.
 Red-light treatment of smallpox, 427, 428, 444, 494.
 Reed (D. M.) on Hodgkin's disease, 343; on lymphatic leukemia, 342.
 Reed and Ward on infectious mastitis, 242.
 Reeves (H. A.) on treatment of corns, 430.
 Reflex, vomiting, increased excitability of, 171.
 Reflexes, 378; spinal, 527.
 Reflexograph, 378.
 Reformatory, Elmira, 563.
 Regurgitation, aortic, musical murmur in, 149.
 Reicher's methods of obtaining crystallized hemoglobin, 618.
 Reid (J.) on arsenical neuritis, 552.
 Remittent fevers, prolonged, of children, 267.
 Renal epithelium, disturbance in regeneration of, 365; infarcts, fat of, 367.
 Renault on mercury cyanide in syphilis, 456.
 Rennie (G. E.) on astereognosis in tabes, 385.
 Respiration in high altitudes, 164; physiology, 511.
 Respiratory apparatus, diseases of, typhoid bacillus in, 16; center, 511; sounds, origin of, 162; system, diseases of, 162; system, in children, diseases of, 272; system, pathology and bacteriology, 354.
 Responsibility, criminal, of epileptic, 561; legal aspects, 563.
 Retroperitoneal cyst, 215.
 Reynolds (A. R.) on pneumonia, 56.
 Rheumatic endocarditis, prevention of restoration of valve-function in, 149; heart in children, 277; hyperpyrexia, 66; myocarditis, 353; symptoms in children, 282.
 Rheumatism, 64; abarticulat tuberculous, 34; acute articular, bacteriology, 65; acute articular, infectious nature, 317; acute, etiology of, 317; articular, in children, arrested development of extremities following, 283; articular, immunity in, 66; aspirin in, 474; complications, 66; etiology, 64; heat in, 68; hot air in, 68; massage in, 68; micrococcus of, 64, 65; myocarditis in, 67; obstinate subacute, 66; quinin in, 496; serum-treatment, 67; spinal, 66; symptomatology, 66; treatment, 67.
 Rheumatoid arthritis, acute, pathology of, 317; and exophthalmic goiter, relation between, 110, 404; and tetany, relation between, 110; reflexes in, 108; vasomotor and ocular phenomena in, 110.
 Rhinoscleroma after trauma, 436.
 Rhythm of heart, disturbances of, 153.
 Richards on infantile diarrhea, 580.
 Richards and Vosburg on adrenalin glycocuria, 520.
 Richardson (H.) on sodium glycocholate, 497.
 Richardson (M.) on urotropin for disinfecting urine in typhoid fever, 502.
 Rickets, 285; congenital, 286; from pasteurized or sterilized milk, 244; treatment, 285.
 Rideal and Walker on standardization of disinfectants, 584.
 Ridge (J. J.) on guaiacol in variola, 487.
 Rieger's diacetic-acid reaction, 99.
 Riesman (D.) on uremic aphasia, 230.
 Riesman and Fussell on pneumothorax, 169, 356.
 Rigor-mortis from coagulation of muscle-proteids, 622; physiology, 525.
 Rinnehart (J. F.) on x-rays in skin cancer, 438.
 Ring bodies in anemic blood, 340.
 Ringworm, epicar in, 481; of thigh, favus of scrotum with, 423; treatment, 422.
 Ritter on treatment of corns, 430.
 Robertson (W. E.) on diet in typhoid fever, 23.
 Robin (A.) on preserving antiserum for detection of human blood, 566.
 Robinson (A. R.) on skin cancer, 438.
 Roborat, physiologic chemistry, 626.
 Rockwell (A. D.) on lupus, 431.
 Rocky mountains, spotted fever of, 73.
 Rodent ulcer, light treatment, 433; treatment, 439; x-ray in, 432.
 Rogers (L.) on blood-examination in cholera, 77.
 Rolleston (H. D.) on hereditary edema, 113, 291.
 Rolleston and Wightwick on trional poisoning, 543.
 Rollins (W.) on Bertillon method of identification, 564.
 Röntgen rays, 502. See also X-rays.
 Rosenau on impurities of vaccine lymph, 579.
 Ross (A.) on intermittent fever, 52.
 Rotch (T. M.) on hygienic requirements in milk trade, 588; on tuberculous peritonitis in children, 261.
 Row (R.) on serum reaction of *Bacillus testis* in, in plague, 335.
 Rubella followed by measles and scarlatina, 258.

- Rudis-Jicinsky on effect of *x*-rays on living tissue, 441.
 Rudolf (R. D.) on Kernig's sign in children, 298.
 Rudolph (R.) on antitoxin of diphtheria, 470.
 Ruffer and Bey on cholera, 77.
 Rupture of aorta, 158; of heart, 151, 532.
 Russell (J. W.) on dilation of duodenum in multiple neuritis, 182; on ophthalmoplegic migraine, 380.
 Russell and Allen on rheumatic hyperpyrexia, 66.
- SABINEN**, 616.
 Sachs (B.) on amaurotic family idiocy, 412.
 Sadler (E. A.) on hemophilia, 137.
 Sahlis method of investigating gastric function, 173.
 Sailer (J.) on pseudoleukemia and tuberculosis, 344.
 Sailer and Kneass on agglutination and pathogenicity of *Bacillus subtilis*, 335.
 Salant (W.) on effect of strychnin on nephrectomized animals, 550.
 Salant and Meltzer on influence of nephrectomy on absorption, 365.
 Salicylic preparations, effect of, on genito-urinary tract, 224.
 Saline diuresis, physiology, 517.
 Saliva, sympathetic, and chorda, temperature of, 513.
 Salivary digestion in stomach, 513.
 Salmon (D. E.) on relation of human and bovine tuberculosis, 29.
 Salol, decomposition of, 612.
 Salt solution, hypodermoclysis with, effects of, 233; in morphin poisoning, 555.
 Salts, radium, action of, on globulin, 629.
 Sanatorium for tuberculosis, 574.
 Sanger and Graham-Smith on biologic test for blood, 627.
 Sanitary legislation, English, for 1902, 596; recent, 595.
 Sansom (A. E.) on rheumatic heart in children, 277.
 Saprophytes, acid-fast, effect of injections of, in tuberculosis, 43.
 Sarcomatoma of thyroid, 338.
 Sarcoma, gastric, 190; intracranial angioplastic, in children, 302; of spinal cord, 389; of vagina in children, 302.
 Sarcomatosis, multiple, of central nervous system, 398.
 Sarcome angioplastique, pathology and histology, 339.
 Satterthwaite on temporary pulmonary insufficiency, 150.
- Saunby (R.) on alcoholism in relation to glycosuria and diabetes, 92.
 Saunders (E. W.) on pilocarpin in scarlet fever, 253.
 Savage (W. G.) on colon bacillus in drinking-water, 320.
 Scar keloid, spontaneous, 437.
 Scarlet fever and measles, rubella followed by, 258; bacteriologic blood-examinations in, 318; blood in, 251; carbolic acid in, 253; cold in treatment of, 253; convalescent-serum in, 253; *Diplococcus scarlatinae* as cause, 251; following measles, 252; kidneys in, 252; Moser's serum in, 252, 253; pilocarpin in, 253; relapses of, 251; streptococcemia in, 318; streptococci in, 250, 251; streptococci in throat in, 318.
 Schamberg (J. F.) on red-light treatment of smallpox, 494; on smallpox, 428; on syphilis mistaken for smallpox, 460.
 Schamberg and Welch on nephritis in variola, 70.
 Schmidt (A. E.) on technic of *x*-ray therapy in skin diseases, 446.
 School-boys, habitual use of tobacco in, 303.
 Schultz (O. H.) on aneurysmal dilation of ductus arteriosus, 351.
 Schwab and Green on insular sclerosis, 392.
 Sclerema neonatorum, 430.
 Sclerosis, amyotrophic lateral, 391; arterial, as cause of nervous disease, 381; disseminated, 397; insular, 392; multiple, 397; multiple, secondary degenerations in, 398.
 Scott (J. A.) on intestinal obstruction from gallstones, 199.
 Serotum, favus of, with ringworm of thigh, 423.
 Scurvy, 137, 285; from pasteurized or sterilized milk, 244.
 Sears (G. C.) on pleurisy in typhoid fever, 17.
 Sears and Lord on cirrhosis of liver, 206.
 Secretin, 514; physiologic chemistry, 630.
 Secretion, internal, 521; maternal, neglect of, 241.
 Segmentary myocarditis, 151.
 Seibert (A.) on typhoid fever in children, 250.
 Seiler (G.) on renal colic, 234.
 Seligmann (C. G.) on albinism, 429.
 Seligmann and Dudgeon on hydatid disease with eosinophilia, 127.
 Semon (F.) on hay-fever antitoxin, 487.
 Sense of taste, persistence of, 379.
 Sepsis, bacteriology, 82; collargol in, 84; Credé's silver in, 84.
 Septic conditions, 82.
 Septicemia, formalin in, 485; from typhoid bacilli, 14; meningococcus,

- 85; pneumococcus, 61; pneumococcus, epidemic, 62.
 Septicemic glanders in man, 319.
 Sequeira on rodent ulcer, 439.
 Serin, 601; from hydrolysis of horn, 604.
 Serosamucin in ascitic fluid, 622.
 Serositis, multiple, 145.
 Serum, antimorphin, 467; antiplague, 467; antipneumococcus, 468; anti-searlatinal, 468; antistaphylococcus, 468; antistreptococcus, 468; anti-streptococcus, active substances of, 609; antistreptococcus, in infective endocarditis, 149; antistreptococcus, in malignant endocarditis, 469; anti-streptococcus, in tuberculosis, 469; antityphoid, 471; blood-, hemolytic power of, change of, 333; blood-, in insanity, 413; blood-, in smallpox, 312; blood-, in smallpox, 313; blood-, lipolytic action of, 612; normal, plurality of cytolysins in, 328; blood-, saponifying action of, 613; chloroform in, dissolving casein and gelatin, 611; convalescent, in scarlet fever, 253; dysentery immune-, reaction of water bacteria with, 310; for dissolving diphtheria bacilli, 257; for morphin poisoning, 554; Haffkine's, in plague, 76, 467; hemagglutinins of cold-blooded animals, multiplicity of, 332; in diphtheria, 256; in dysentery, 196; in typhoid fever, 23; in variola, 72; Moser's, in scarlet fever, 252, 253; reaction of *Bacillus testis* in plague, 335; Trunecek's, 501; Trunecek's in arteriosclerosis, 158; Yersin's, in plague, 76, 467.
 Serum-albumin, hydrolytic products, 604.
 Serum-complements, bacteriolytic, in disease, 329.
 Serum-diagnosis of nature of blood, 120.
 Serum-treatment of rheumatism, 67.
 Sewage, oysters and, 591.
 Shattuck (F. C.) on tuberculous peritonitis, 46, 262; on typhoid fever, 23.
 Shaw (H. B.) on erythromelalgia, 370, 383.
 Sheldon (J. G.) on abscess of liver after typhoid fever, 361.
 Sherrington and Laslett on spinal reflexes, 527.
 Sherrington and Sowton on chloroform, 478.
 Shiga dysentery bacilli and serum reactions in epidemic dysentery, 310.
 Shipley and Nuttall on Anopheles, 581.
 Shock, adrenalin in, 464; nervous, psoriasis after, 419.
 Sialolithiasis, 171.
 Siau and Brodie on phloridzin glycosuria, 519.
 Sill (E. M.) on infants fed on pasteurized or sterilized milk, 244.
 Silver, 496.
 Simmons (C. C.) on Hodgkin's disease, 344.
 Sinkler (W.) on indiscriminate use of antipyrin and similar drugs, 468.
 Sinus thrombosis in children, 294.
 Sinuses, cerebral, thrombosis of, 161.
 Skae (F. M. T.) on dengue, 79.
 Skatosome, 631.
 Skillman (W. F.) on dimethylamidoazobenzol test for free HCl in stomach contents, 173.
 Skin, angiomas of, relation of, to malignant disease, 436; atrophies of, 429; blastomycosis of, 427; blastomycosis of, from accidental inoculation, 435; carcinoma of, x-rays in, 438, 439; creeping larva in, in children, 301; diseases, 415; diseases, actinotherapy in, 449; diseases, dependence of, upon nutritive disturbances, 443; diseases, glycerolates in, 450; diseases of, Finsen's light in, 444; diseases of, in children, 301; diseases, picric acid in, 494; diseases, radium in, 496; diseases, suprarenal extract in, 449; diseases, therapeutics in, 444; diseases, x-rays in, 432, 445, 447; diseases, x-ray in technic, 446; effect of x-ray on, 440; hypertrophies of, 429; inflammations of, 416; inoculation tuberculosis of, 30; leprosy, histologic changes of, 319; neoplasms of, 430; pigmentation of, in exophthalmic goiter, 107; pigmentation of, in women, genital origin, 429; tuberculous ulcers of, balsam of Peru in, 436.
 Skinner (C. E.) on hot air in rheumatism, 68.
 Slaughter (R. M.) on pneumococcal arthritis, 63.
 Sleeping-sickness, 80; and trypanosomiasis, 80; etiology, 80; trypanosome in cerebrospinal fluid in, 81.
 Sloan (A. B.) on relapses of scarlet fever, 251; on vulvar eruption after vaccination, 418.
 Smallpox, 69. See also *Variola*.
 Smith (E.) on convulsive attacks in children, 297; on ergot, 481.
 Smith (G. F.) on aspirin in rheumatism, 474.
 Smith (W. M.) on fragility of bones in insane, 412.
 Smith and Reagh on agglutinins acting on flagellums and bacteria, 333.
 Smyth (J.) on quinin in malaria, 55.
 Snow (I. M.) on pseudotetanus in diphtheria, 257.
 Snyder (J. R.) on inspection of dairies, 242.
 Sobel on whooping-cough, 259.
 Soda arsenite in tuberculosis, 45; methylarsenate in malaria, 56.
 Sodium bicarbonate, 496; borate in

- obesity, 114; chlorid metabolism, 524; cinnamate, 497; cinnamate in tuberculosis, 497; compounds, toxicology, 549; glycocholate, 497; phosphate, 497.
- Softening of pons and medulla, 396.
- Soil pollution, relation to endemic conditions, 592.
- Sollmann (T.) on chlorid in urine, 517; on hydrops cystidis felleæ, 614.
- Sollmann and Hatcher on chlorid in urine, 517.
- Somnoform, 497; as anesthetic, 497.
- Sore-throat from milk, 171.
- Souchon on yellow fever, 74.
- Southworth (T. S.) on pulmonary edema, 273; on maternal secretion, 241.
- Spasm of abdominal muscles, 193.
- Spastic obstipation, 193.
- Specific gravity of urine, freezing-point depression and, 626; relation of, to solids of urine, 631.
- Speech, disturbances of, in children, 294.
- Spencer (G.) on selection and administration of anesthetics, 482.
- Spiller (W. G.) on multiple sclerosis, 398; on nervous system in lead-poisoning, 370; on paradoxical reaction of pupil for accommodation, 378; on partial internal hydrocephalus, 371.
- Spiller and Hendrickson on sarcomatosis of central nervous system, 398.
- Spiller and Mills on hemiplegia, 394.
- Spinal cocainization, dangers in, 479; column, inflammation of, 110; cord and medulla, changes in, in pernicious anemia, 131; cord, anemic, conduction in, 380; cord, diseases of, 385; cord in children, proliferation of tissue about central canal of, 299; cord, sarcoma of, 389; cord, tuberculous tumor in, 307; cord, tumors of, 388; disease, mimicry of gastric troubles by, 179; meninges, diseases of, 382; nerves, diseases of, 382; paths, 527; paths, sensory, 527; reflexes, 527; rheumatism, 66; symptoms in acute morphin poisoning, 555.
- Spine, lateral curvature of, and tuberculosis, relation between, 31.
- Spinocerebellar tract, dorsal, 527.
- Spitta on pneumococcus infection in child, 61.
- Spitzer (L.) on hot-air in lupus, 434.
- Splanchnic nerve in determining blood-pressure, 141.
- Spleen, enlarged, in children, syphilis as cause, 262; leukemic, products of autolysis of, 620; myeloid function of, 133; percussing of, in children, 282; puncture of, diagnosis of typhoid fever by, 21.
- Splenic anemia, 138; acute, 139; erythromelalgia complicating, 138; in children, 281; with diffuse productive nephritis, 358.
- Spondylitis deformans, 110.
- Sporadic cretinism, 289.
- Spotted fever of Rocky Mountains, 73.
- Spratling (W. P.) on bromopin in epilepsy, 475; on sensory aura of epilepsy, 410.
- Springing mydriasis, 159.
- Sprue, 193.
- Sputum, chemistry of, 631.
- Stagnation-cirrhosis of liver, 207.
- Stagnation-icterus in cholelithiasis, 210.
- Staining malarial organisms, 53.
- Stains, blood-, medicolegal tests of, 564; origin of, diagnosis, 564.
- Stanton (W. B.) on method for determining blood-pressure, 140.
- Staphylococcus aureus, infection with, 84.
- Starch-digesting capacity of infant's intestines, 248.
- Starling and Bayliss on enterokinase and trypsin, 515; on secretion, 514, 630.
- Starr (M. A.) on arterial sclerosis as cause of nervous disease, 381; on surgical treatment of brain tumor, 400.
- Statistics, criminal, in England and Wales, 561; vital, 597; vital, of England, for 1902, 598.
- Steele (J. D.) on pancreatitis, 363; on diabetes, 90; on hepatoptosis, 208.
- Steele and Francine on gastrophtosis, 184.
- Stegomyia fasciata, 581, 582.
- Stelwagon (H. W.) on vaccinal eruptions, 418.
- Stengel (A.) on sensations as of living animals in stomach, 177; on syphilis of lung, 166.
- Stengel and White on acetanilid poisoning, 120, 462.
- Stenosis, congenital, of pylorus, in children, 265; hypertrophic of pylorus, in infant, 265; intestinal, 199; intestinal, treatment, 199; mitral, paralysis of recurrent nerve in, 149; mitral, pregnancy in, 150; of esophagus, thiosinamin in, 500; pulmonary, congenital, 150; pyloric, 180; pyloric, of biliary origin, 181.
- Stern (H.) on Graves's disease, 107; on treatment of uremia, 233; on uremic state, 364.
- Steuber on yaws and syphilis, 459.
- Steven (J. L.) on bacteriologic findings in bronchopneumonia, 274.
- Stevens (M. L.) on blood in tuberculosis, 32.
- Stevenson (T.) on tartar emetic poisoning, 554.
- Stewart (G. N.) on hemolysis, 507.
- Steward and Ballance on facial paralysis, 392.

- Stiles (C. W.) on dipylidium, 237; on uncinariasis in United States, 234.
 Stiles and Hassell on *Strongyloides stercoralis*, 327.
 Stiles and Lusk on effect of pancreatic digestion on sugar formation, 609.
 Stillman (E. R.) on sclerema neonatorum, 430.
 Stock's acetone-reaction, 99.
 Stockton (C. G.) on syphilis of liver, 208.
 Stokes, Ruhrhah, and Rohrer on thymus gland as index of general nutrition in infants, 291, 348.
 Stomach, absorption of alkaline iodids from, 175; adenoma of, 186; amyloid degeneration in, 188; carcinoma of, 188 (see also *Carcinoma, gastric*); dilation of, 181 (see also *Gastric dilation*); diseases of, 173; diseases of, relation of indicanuria to, 619; fibromyoma of, 358; fungus in, 177; fungus in, relation to pathologic changes in, 176; gastric mucosa in pathologic conditions of, 178; hemorrhagic erosions of, 180; hour-glass, diagnosis, 186; hyperacidity of, 179; hyperacidity of, bismutose in, 187; infusoria in, 176; lactic acid in, demonstrating, 173; methods of examination, 173; motor functions of, influence of various positions of body on, 175; salivary digestion in, 513; sarcoma of, 190; sensations as of living animals in, 177; syphilis of, 188; ulcer of, 185 (see also *Ulcer, gastric*); ulcers of, multiple, in child, 266; urobilin in, 633.
 Stomach-contents, albumin-digesting power of, 174; dimethylamidoazobenzol test for free HCl in, 173; filtration of, 173; green color of, 176; pepsin in, determining of, 174.
 Stomach-tube, 179.
 Stomatitis, mercurial, hydrogen dioxid in, 488; ulcerative, epidemic, 170.
 Stookey on formation of glycogen from glucoproteids, 618.
 Stookey and Levene on proteid metabolism, 523.
 Streptococcemia in scarlet fever, 318.
 Streptococcus, agglutination of, 84; distribution of, in water, 320; examinations of, 318; in scarlet fever, 250, 251; in throat in scarlet fever, 318; infection, formalin in, 484; pyogenes, relation of, to variola, 313.
 Streptothrix pyemia, 86.
 Strong (L.) on gastric tetany in children, 300.
Strongyloides stercoralis, 327.
Strongylus, 236.
 Strychnin, 498; effect of, on nephrectomized rabbits, 550; in heart-disease, 498; in tic douloureux, 498; poisoning, 550.
 Sublamin, 498; and ethylene-diamin compound of mercury, toxicology of, 559.
 Sudden death, enlarged thymus as cause, 349; in infants, 290, 291.
 Sudler (M. T.) on typhoid fever, 11.
 Suffocation from ascarides in children, 265.
 Sugar formation, effect of end-products of pancreatic digestion on, 609; in urine, test for, 86; split from nucleoprotein of liver, 622, 623; source of, in phloridzin glycosuria, 520.
 Suicides in Germany, 561; in United States, 562.
 Sulfate, toxicology, 549.
 Sulfite poisoning, chronic, 593.
 Sulfonal, multiple neuritis due to, 382.
 Sulfur, 498; in tropical dysentery, 197.
 Sulfuretted hydrogen, poisoning by, 543.
 Sulfuric acid, 498.
 Sulfurous acid as disinfectant, 584.
 Sunstroke in soldiers, 587.
 Suprarenal, antitoxic functions of, 349; extract in Addison's disease, 45; extract in skin diseases, 449; extract in tuberculosis, 45; extract in typhoid fever, 24; extract producing glycosuria, 88; hemorrhage into, 349; lecithin in, 632; physiologic chemistry, 631.
 Survivorship, medicolegal aspects, 535.
 Sutherland (G. A.) on neuroses in children, 294; on tuberculous peritonitis, 261.
 Sutherland (L. R.) on chloroma, 136.
 Sutro (T.) on survivorship, 535.
 Sweating, effect of, on blood, 117.
 Sweeping or dusting by aspiration, 600.
 Sweet (J. E.) on hemolytic complement in blood of rabbits, 329; on reactions of blood in experimental diabetes mellitus, 335.
 Swift (G. M.) on adherent pericardium, 277.
 Swinburne (G. K.) on argyrol in gonorrhœa, 472.
 Syers (H. W.) on erythema nodosum, 416.
 Sylvester (C. B.) on renal symptoms after mumps, 225.
 Symes (J. O.) on tuberculous pericarditis, 147.
 Symmers (D.) on cutaneous angiomas, 436.
 Sympathetic nerves and vagus, influence of, on gaseous exchange in lungs, 512; saliva and chorda, temperature of, 513.
 Syphilis, 450; anatomicopathologic characteristic, 451; and smallpox, differential diagnosis, 460; and venereal diseases, prevention, 450; as cause of death, 454; as cause of enlarged spleen in children, 262; as cause of

general paralysis, 454; bacillus of, 453; blood in, 454; blood-plates in, 123; calomel in, 477; congenital, in children, 262; corrosive sublimate in, 456; diabetes insipidus in, 102; gastric, 188; hereditary early, without eruptions, 452; hermophenyl in, 458; inoculation of, experimental, 322; iodin compounds in, 459; Justus test for, 454; mercuric chlorid in, 456, 459; mercury in, 455, 456, 457; mercury in, in massive doses, 458; mercury acetamid in, 458; mercury biniodid in, 459; mercury cyanid in, 456; mercury salicylate in, 457; of heart, 354; of liver, 208; of stomach, 188; open-air treatment, 455; pulmonary, 166; spread of, prevention, 451; transmission of, 452; treatment, 455; ulcerous and gummous, blood in, 453; yaws and, 459.
 Syphilitic and parasyphilitic changes, coexistence of, 453; disease of heart, 143; nephritis, acute, 225.
 Syringomyelia, 392.
 Systole, extra, 153

TABES, 385. See also *Locomotor ataxia*.
 Tachycardia, paroxysmal, 154; paroxysmal, epileptic character of, 409.
 Talley (J. E.) on scurvy, 137; on splenic anemia, 139.
 Tapeworm in children, 272.
 Tar and petroleum in suppression of dust, 600.
 Tartar emetic, poisoning by, 554
 Taste, effect of chloroform on, 529; nasal, 528; sense of, persistence of, 379.
 Tattoo marks, 429.
 Taylor (A. E.) on acute yellow atrophy of liver, 360; on fatty degeneration, 371.
 Taylor (G. G.) on vivisection, 536.
 Taylor (G. G. S.) on new form of Finsen lamp, 449.
 Taylor (T.) on skin cancer, 438.
 Taylor and Waterman on Landry's paralysis, 391.
 Temperature of chorda and sympathetic saliva, 513; of infants, taking of, after birth, 272; of joints, influence of stagnation of circulation upon, 111.
 Terpenes, cyclic, destiny of, in organism, 615.
 Test, biologic, for blood, 627; carbonic acid, as index of atmospheric impurity, 599; for sugar in urine, 86; for urobilin in urine, 633.
 Testicle, physiology, 523.
 Tests, medicolegal, 567; medicolegal, for blood-stains, 564.
 Tetanus, 402; antitoxin, 498; brain emulsion in, 402; carbolic acid in, 478;

cultures, formation of toxoids in, 326; following vaccination in children, 264; from gelatin, 486; toxin, effect of, on hemoglobin and blood-corpuscles, 334; toxin, propagation of, 403.
 Tetany and rheumatoid arthritis, relation between, 110; gastric dilation with, 183; gastric, in children, 300; in children, 300; latent, in children, 300.
 Thallium sulfate, 499.
 Thayer (W. S.) on hemorrhagic polymyositis, 114.
 Theobromin, 499.
 Theocin, 499; diuretic effect of, 232.
 Therapeutics, experimental, 461.
 Thermoanesthesia and thermoanalgesias as symptoms of disease of brain-stem, 396.
 Thigh, ringworm of, favus of scrotum with, 423.
 Thiocol, 500; in tuberculosis, 500.
 Thiosinamin, 500; in esophageal stenosis, 500.
 Thomas (H. M.) on neurofibromatosis, 384.
 Thoma-Zeiss blood-counting apparatus, new chamber for, 115.
 Thompson and Watson on myelocene in psoriasis, 420.
 Thomson (H. C.) on dilation of stomach, 183.
 Thomson (J.) on chronic valvular disease, 277; on defective coordination in utero, 266.
 Thomson (W. H.) on treatment of uremia, 232.
 Thomson and Brownlee on serum in variola, 72.
 Thoracic aneurysm, inequality of pupils in, 158.
 Thoracocentesis, albuminous expectoration after, 169.
 Throat and mouth, diseases of, 170.
 Thrombi composed of agglutinated red blood-corpuscles, 345.
 Thrombosis, 161; cardiac, in diphtheria, 255; femoral, in pneumonia, 60; of cerebral sinuses, 161; of cerebral veins and sinuses with bronchopneumonia, 352; sinus, in children, 294.
 Thrush, sucking bag in treatment of, 264.
 Thursfield (H.) on obliteration of innominate artery, 352.
 Thymin, physiologic chemistry, 628, 629.
 Thymus as index of general nutrition in infants, 291; enlarged, as cause of sudden death, 349; nucleic acid, 624; physiology, 522; relation of, to marasmus, 348.
 Thyroid, accessory, 347; adenocarcinoma of, primary, 338; extract, 500; extract in pruritus with jaundice, 442;

- extract in psoriasis, 419; osteochondrosarcoma of, 337; physiology, 521; sarcocarcinoma of, 338; structure of, in newborn, 347; tumors of, mixed, 337.
- Thyroidal structure, bone tumors with, 337.
- Thyroidectomy, anatomic changes in various organs after, 348.
- Tic douloureux, strychnin in, 498.
- Tickell on gelatin in hemophysis, 486; on gelatin in tuberculosis, 46.
- Ticks, blood in, after sucking, 119.
- Tin, 500.
- Tinea circinata, epicarin in, 422; favosa capitis, izal in, 424; imbricata, 424; of nails in iceland, 424; tonsurans, epicarin in, 422.
- Tobacco, habitual use of, in school-boys, 303; neutralizing toxic action of, 543.
- Toes, blue, 442.
- Tonkin (T. J.) on Sudanese leprosy, 79.
- Tonsils, tuberculosis of, 30.
- Torticollis, spasmodic, atropin in, 474.
- Townsend (C. W.) on cream for home modification, 243.
- Toxicology, medicolegal aspects, 541.
- Toxoids, formation of, in tetanus cultures, 326.
- Tracheobronchial glands, tuberculous lymphadenitis of, 35.
- Trauma in causation of gastric ulcer, 185; relation of, to fat necrosis, 213; rhinoscleroma after, 436.
- Trematoda, 237.
- Tremor in exophthalmic goiter, 107.
- Trehphining in cerebral hemorrhage, 393.
- Treves on mercuric chlorid lotion in syphilis, 459; on mimicry of gastric troubles by spinal disease, 179.
- Tribromphenol, bismuth, 504.
- Trichophyton-like cultures, identical, 423.
- Tricuspid leaflets, malformation of, 354.
- Trikresol in alopecia areata, 429.
- Trional, 501; poisoning, 501, 543.
- Triticonucleic acid, 623, 624.
- Trophoneuroses, 404.
- Trotter (R. S.) on anthracosis and tuberculosis in coal-miners, 31.
- Truneeck's serum, 501; in arteriosclerosis, 158.
- Trypanosoma, 238; infection, 314.
- Trypanosome in blood, 238; in cerebro-spinal fluid in sleeping-sickness, 81.
- Trypanosomiasis and sleeping-sickness, 80, 81; in man, 314.
- Trypsin, 515.
- Trypsinogen of pancreatic juice, 515.
- Tryptophan, chemistry of, 606.
- Tubercle bacillus, agglutination of, 39; from animals, composition of, 306; composition of, from various animals, 632; effect of disinfecting wall paints on, 583, 584; fat of, 633; infection of calves and goats with, 30; pseudo-infection with, 39.
- Tubercles, choroidal frequency of, in tuberculosis, 40.
- Tuberculin, 501; in diagnosing tuberculosis, 37; treatment of tuberculosis with, 43.
- Tuberculosis, 27; acid-fast bacilli in, 39; and anthracosis in coal-miners, 31; and carcinoma, relation, 31; and diabetes, relation, 93; and heart disease, relation, 32; and Hodgkin's disease, differentiation, 35; and lateral curvature of spine, relation between, 31; and malignant lymphoma, 36; and occupation, relation between, 31; antistreptococcus serum in, 469; bacillus of, 306 (see also *Tubercle bacillus*); bacteriology, 306; blood in, 32; bovine and human, relation, 27, 29, 572; choroidal tubercles in, frequency of, 40; complicating leukemia, 134; cost of, 572; diagnosis, 36; diagnosis, by animal injection, 38; diagnosis, by cog-wheel breathing, 37; diagnosis, by Krönig's method, 36; diagnosis, by percussion of lungs, 36; diagnosis, by serum, 39; diagnosis, by tuberculin, 37; diazo reaction in, 41; dietetic treatment, 44; effect of injections of acid-fast saprophytes in, 43; electric-light baths in, 45; etiology, 27; extinction of, probable, 573; formalin in, 485; formalin-alcohol-ether mixture in, 45; from food, 28; gelatin in, 46; generalized, in children, 260; genital, in children, 293; gold miner's, 586; granulations of erythrocytes in, 123; hemoptysis as symptom, 40; heliotin in, 45; hyperplastic, of veriform appendix, 358; ichthyl in, 489; imperfect development of first rib in, 46; in children, 260; in different climate, 31; infection through digestive tract, 27, 28; influence of, on duration of life, 40; inhalation in, 46; inoculation, of skin, 30; leukemia terminating in, 134; lung-murmur in, 33; measurements of heart in, 142; medicinal and nutrient treatment, 44; metabolism in, 31, 32, 44; methylene-blue in, 492; milk and, 589; newly formed joint in connection with first costal cartilage in, 46; of bronchial glands, 35; of esophagus, 357; of lymphatic apparatus, 35, 306; of myocardium, 34; of tonsils, 30; pathology, 27, 306; prevention of, in early stage, 573; prognosis, 40; relation of lupus erythematosus to, 430, 431; sanatorium for, 574; soda arsenite in, 45; sodium cinnamate in, 497; sputum of, albumoses in, 632; sputum of, prognostic value, 41; suprarenal extract in, 45; symptomatology,

- 32; thiocol in, 500; treatment, 41; treatment, with tuberculin, 43; urea in, 502; urinary calcium excretion in, 632; vaccinating cattle against, 41, 42; weight in, 40.
- Tuberculous angiodermatitis of hands, 431; glands of neck, suppuration of, 307; lymphadenitis of tracheobronchial glands, 35; meningitis and typhoid fever, 19; meningitis in children, 295; pericarditis, 147; peritonitis, 33; peritonitis in children, 261; peritonitis in children, prognosis, 261; peritonitis in children, treatment, medical, 261; peritonitis, prognosis and treatment, 46; pleurisy, productive, 33; rheumatism, abarticulär, 34; tumor, in spinal cord, 307; ulcers of skin, balsam of peru in, 436.
- Tucker and Huger on Justus test for syphilis, 454.
- Tuley (H. E.) on temperature of infants, 272.
- Tumor, bacteriology and pathology, 337; bone, with thyroïdal structure, 337; in children, 302; mixed, of thyroid, 337; of brain, 400; of brain, surgical treatment, 400; of cerebellum, 402; of spinal cord, 388; tuberculous, in spinal cord, 307.
- Tunnicliffe on phenolphthalein as purgative, 201.
- Tunnicliffe and Hewlett on lysoform, 491.
- Tunnicliffe and Rosenheim on action of substances on heart, 510.
- Turck (F. B.) on experimental production of gastritis, 180.
- Turner (D.) on tuberculosis, 45; on typhoid fever, 12.
- Tyler and Williamson on myelitis, 390.
- Typhoid bacilluria, 17, 18; bacillus, dissemination of, through butter, 308; in blood in typhoid fever, 574; in diseases of respiratory apparatus, 16; in urine, 17, 18; septicemia from, 14.
- Typhoid-colon group of bacilli, intermediate members, types of infection produced in man by, 309.
- Typhoid fever, 11; abscess of liver after, 361; acetonuria in, 14; acetozone in, 462; and tuberculous meningitis, 19; antityphoid serum in, 471; atypic, 13; bacillus of (see also *Typhoid bacillus*); bacteriology, 307; complications, 14; conveying of, by house-fly, 12; diagnosis, 19; diagnosis, bacteriologic, 19; diagnosis, by puncture of spleen, 21; diazo reaction in, 21; dicrotism in, 13; diet in, 23; Eberth's bacillus in blood in, 574; epidemic, 11; fecal impaction in, 15; flies in cause of, 580; gangrene in, 18; hemorrhagic, 17; in children, 248, 249; in children, blood in, 250; in children symptoms and etiology, 249; in children, Widal test in, 249, 250; infection, soil, fabrics, and flies in dissemination of, 307; inoculations against, 22; Kernig's sign in, 378; lactophenin in, 24; meningeal forms of, 19; milk in, 22; oysters and, 574; pathology, 307; peritonitis in, 15; pleurisy in, 17; prophylaxis, 22; pyramidon in, 23; relapses in, 14; serum in, 23; suprarenal extract in, 24; symptomatology, 13; treatment, 22; Widal test in, 20; with trichinosis and eosinophilia, 18; pyramidon in, 495.
- Typhus fever, 81; protozoa in, 81.
- Tyzzer and Brinckerhoff on amphophile leukocytogenesis in rabbit, 344.
- ULCER,** duodenal, 198; gastric, bismuth in, 187; gastric, bismutose in, 187; gastric, complications, 185; gastric, etiology, 185; gastric, frequency of, in Finland, 185; gastric, olive oil in, 187; gastric, orthoform in diagnosis, 185; gastric, pathogenesis, 185; gastric, trauma in causation, 185; gastric, treatment, 187; rodent, light treatment, 433; rodent, treatment, 439; rodent, x-ray in, 432; tuberculous, of skin, balsam of peru in, 436.
- Ulceration, intestinal,** 198.
- Ulcerative endocarditis,** 149; endocarditis, collargol in, 149; endocarditis, healing of, 148; stomatitis, epidemic, 170.
- Ulcers, multiple, of intestines,** 198; of stomach, in child, 266.
- Ullman (J.)** on brewers' yeast, 504.
- Ultra-violet rays and x-rays,** relation between, 445; in lupus, 432.
- Uncinaria,** 234; americana, infection with, in Philippines, 235; duodenalis, anemia from, 236; relation of, to anemias in Cuba, 236.
- Uncinariasis,** 327; and malarial hemoglobinuria, 52; in miners, 586; in United States, 234.
- Underhill and Mendel** on proteoses, 627.
- Uracil,** 628, 629.
- Urea,** 502; in tuberculosis, 502; in urine, determination of, 633.
- Uremia,** 228; hypodermoclysis and infusion in, 233; treatment, 230.
- Uremic aphasia,** 230; convulsions, morphin in, 493; hemolytic reaction, 229; state, pathogenesis, 364.
- Uric acid and purin bases,** origin of, 628; effect of alcohol on, 633; in body, fate of, 102.
- Urinary calcium excretion in tuberculosis,** 632; cryoscopy in diagnosis of disease of kidney, 227; pigment, measurement of, 216; system, pathology and bacteriology, 364.

- Urine, acidity of, 601; albumin in, origin, 365; albumin in, volumetric determination, 601; β -oxybutyric acid in, estimation, 624; bromin in, 216; chlorid in, 517; Ehrlich's dimethylamidobenzaldehyd reaction with, 215; glucose in, fermentation-method of determining, 86; in gastrointestinal catarrh in children, 291; in icterus, glucuronic acid in, 617; in pneumonia, 58; iodin in, 216; nitrogenous substances in, 204; organic constituents of, 624; physical chemistry, 626; physiology, 517; precipitin for, 627; proteolytic enzyme of, origin, 614; solids of, relation of specific gravity to, 631; specific gravity of, freezing-point depression and, 626; sugar in, test for, 86; typhoid bacillus in, 17, 18; urea in, determination of, 633; urobilin in, in carcinoma of liver, 633, 634; urobilin in, test for, 633.
- Urobilin in stomach, 633; in urine in carcinoma of liver, 633, 634; in urine, test for, 633.
- Urobilinuria, 216; origin, 216.
- Urophenin, diuretic effect of, 231.
- Urotropin, 502; effect of bacteria on, 502; idiosyncrasy to, 502.
- Urriola on idiosyncrasy for iodoform, 546.
- Uterine fibroid, iodipin in, 490.
- Uterus, child in, medicolegal aspects, 537.
- Uvula and soft palate, primary epithelioma of, 357.
- VACCINAL eruptions, 418.
- Vaccinated animals, protection of, 579.
- Vaccinating cattle against tuberculosis, 41, 42.
- Vaccination, 576; against variola, 71; compulsory, in France, 577; experimental, against bacillus of dysentery, 311; psoriasis after, 419; tetanus following, in children, 264; vulvar eruption after, 418.
- Vaccine lymph, bacteriologic impurities of, 579.
- Vagina, sarcoma of, in children, 302.
- Vagus and sympathetic nerves, influence of, on gaseous exchange in lungs, 512; dyspneic stimulation of, 510.
- Valvular disease, chronic, 149.
- Van Harlingen on creeping larvas in children, 301.
- Van Harlingen and Dillard on epicarin, 481; on tinea tonsurans and tinea circinata, 422, 423.
- Van Zandt on creasote in pneumonia, 61.
- Variola, 69; and syphilis, diagnosis, differential, 460; bacteriology and pathology, 311; blood-serum in, 312, 313; carbolic acid in, 72; carbolic acid in, 477; case of wrongfully certifying, 579; epidemic, 70; etiology, 69; etiology and pathology, 311; guaiacol in, 487; nephritis in, 70; parasite of, supposed, 312; prophylaxis, 71; red-light treatment, 72, 427, 428, 444, 494; relation of streptococcus pyogenes to, 313; revaccination in, 71; serum in, 72; treatment, 72; vaccination in, 71; vesicles and pustules of, contents of, 428.
- Varney (H. R.) on radiotherapy in skin diseases, 445.
- Vasomotor function, lymph and, 508.
- Vaughan on intracellular toxins, 619.
- Vena cava, inferior, obstruction of, 351; obstruction of, 162.
- Venereal diseases and syphilis, prevention, 450.
- Ventilation of bake-houses, 585; of factories and workshops, 585.
- Vernon on precipitability of pancreatic ferments by alcohol, 614.
- Veronal, 502.
- Vessels as carriers of mosquitos, 581.
- Vickery (H. F.) on albumosuria, 221.
- Vincent (S.) on extirpation of thymus, 522.
- Viscosity of blood, 118.
- Vital statistics, 597; of England for 1902, 598.
- Vivisection, medicolegal aspects, 536.
- Vomiting, cyclic, in children, 267; reflex, increased excitability of, 171; with acetonemia, 266.
- Von Behring on vaccinating cattle against tuberculosis, 41.
- Vosburg and Richards on adrenalin glycosuria, 520.
- Vulvar eruption after vaccination, 418.
- WACHENHEIM on chronic gastritis, 265.
- Waitzfelder on formalin in septicemia, 485.
- Wakeman and Herter on origin of cholesterol in gallstones, 614.
- Walker (E. W. A.) on micrococci of rheumatism, 65.
- Walker and Beaton on acute rheumatism, 317.
- Walker and Harrington on alcohol, 466.
- Walker and Rideal on standardization of disinfectants, 584.
- Wall and Andrews on chorea of pregnancy, 403.
- Wall and Walker on thoracic aneurysm, 158.
- Wall paints, disinfecting, effect of, on tubercle bacilli, 583, 584.
- Wallace (R.) on angioneurotic purpura, 137.
- Wallace and Jackson on effect of alcohol on gastric secretion, 514.
- Walls (F. X.) on milk in typhoid fever, 22.

- Walsford (A. G.) on quinin in malaria, 55.
 Walsh (J. J.) on obstinate subacute rheumatism, 66.
 Walsham (H.) on aortic aneurysm, 160.
 Walton and Paul on Achilles jerk, 378.
 Wandering heart, 152.
 Wanstall (A.) on whooping-cough, 259.
 Warfield (L. M.) on typhoid fever, 14.
 Warfield and Knox on leukocytes in summer diarrhea, 269.
 Warthin (A. S.) on pathology of pernicious anemia, 130, 341.
 Washbourne and Eyre on *Bacillus influenzae*, 72.
 Water bacteria, reaction of, with dysentery immune-serum, 310; distribution of colon bacillus and streptococci in, 320; drinking-, colon bacillus in, 320; drinking-, existence of nitrites in, 591; drinking-, phosphates in, 592; pathogenic germs in, ozone in destruction of, 591; river-, bacteria in, 593.
 Waterman and Taylor on Landry's paralysis, 391.
 Water-supplies and drainage, 591.
 Watson and Thompson on myelocene in psoriasis, 420.
 Weaver (G. H.) on streptococci in throats in scarlatina, 318.
 Webb (R.) on legal tests of responsibility, 563.
 Weber (L.) on chronic nephritis, 225.
 Weighing, daily, as important diagnostic measure, 142.
 Welch (W. M.) on vaccination, 71.
 Welch and Schamberg on nephritis in variola, 70.
 Wells (E. F.) on endocarditis in pneumonia, 60.
 Wells (H. G.) on fat-nécrosis, 374.
 Wells (R. S.) on purpura, 137.
 Westcott (T. S.) on whey, 244; on diarrhea in children, 268.
 Westinghouse on acetozone in typhoid fever, 23.
 Wheat embryo, nucleic acid from, 622.
 Wheeler and Merriam on pseudothiouras, 629.
 Whey, 244.
 White (W. H.) on rheumatoid arthritis, 317; on cirrhosis of liver, 205.
 White and Craig on continued fever, 26.
 White and Stengel on acetanilid poisoning, 120, 462.
 Whitman (R.) on polyarthritis in children, 283.
 Whitney (H. B.) on dulness under manubrium and aneurysm, 160.
 Whooping-cough, aristochin in, 260; aristoquinin in, 472; bacillus of, 259; ethyl iodid in, 259; leukocytic count in, 259; paroxysms of, treatment, 259; peripheral neuritis in, 383; vomiting of, treatment, 259, 260.
 Widal reaction in typhoid fever, 20; in typhoid fever in children, 249, 250.
 Wightwick and Rolleston on trional poisoning, 543.
 Wilcox (R. W.) on erythroploëum, 482.
 Wild (R.) on ipecac alkaloids, 490.
 Wilkes (G. A.) on pregnancy in mitral stenosis, 150.
 Williams (R. F.) on electric-light baths in tuberculosis, 45.
 Williams (T. W.) on glycerol of iodin, 489.
 Williams (W. C.) on influenza in children, 258.
 Williamson (G. A.) on malaria, 47.
 Williamson (R. T.) on aspirin, 473; on disseminated sclerosis, 397; on glycosuria and diabetes mellitus, 99.
 Williamson and Tyler on myelitis, 390.
 Willoughby on morphin poisoning, 555.
 Wills (W. K.) on lupus and rodent ulcer, 433.
 Wills and Harrison on Finsen light in *lupus vulgaris*, 493.
 Wills, contests of, remedy for, 536.
 Willson (R. N.) bothriocephalus, 237.
 Willson and Packard on tetanus antitoxin, 498.
 Wilson (T. S.) on colon catarrh, 194.
 Wilson and Chowning on spotted fever, 73.
 Windsor and Wright on certain species of pathogenic microorganisms, 334.
 Winfield (J. M.) on malarial origin of zoster, 325, 418.
 Winslow and Hunnewell on distribution of colon bacillus and streptococci in water, 320.
 Winter (G. J.) on essential epilepsy, 298.
 Wolff (A. J.) on Widal test, 20.
 Wollstein (M.) on dysentery bacillus in infantile diarrhea, 310.
 Wood alcohol, effects produced by, 552; sale of, medicolegal aspects, 552.
 Wood (H. C., Jr.) on hyoscin, 488; on ichthargon, 489; on mercuric chlorid poisoning, 560.
 Wood and Hewlett on achondroplasia, 286.
 Woodman on phosphates in drinking-water, 592.
 Woods (R. F.) on lupus erythematosus, 431.
 Woolley (P. G.) on adenocarcinoma of thyroid, 338.
 Workshops and factories, ventilation of, 585.
 Wright (A. E.) on antityphoid serum, 471.
 Wright and Windsor on certain species of pathogenic microorganisms, 334.
 Writing-center, cortical, 400.
 Wynkoop (D. W.) on bronchopneumonia, 57.
 Wynter on tetanus antitoxin, 499.

XANTHELASMOIDEA in adult, 416.

Xeroform, 504.

X-rays, 502; and ultra-violet rays, relation between, 445; dermatitis from, 425, 426; effect of, on living tissue, 441; effect of, on skin, 440; in acne, 422; in alopecia areata, 429; in carcinoma, 503; in carcinoma, of skin, 438, 439; in diseases of skin, 445, 447; in lupus, 431, 432, 439; in lupus, erythematosus, 431; in malignant disease, 503; in rodent ulcer, 432; in skin diseases, 432; in skin diseases, technic of, 446; medicolegal aspects, 534; screen for protection from, 449.

YEAST, 504; pathogenic experimental researches on, 326.

Yeast-cells, dead, and pancreatic cells autodigestion of, proteid decomposition products from, 611.

Yellow fever, 74; alleged parasite of, 316; bacteriology and pathology, 315; etiology, 315; spread of, 582.

Yersin's serum in plague, 76, 467.

Yohimbin, 505.

Young (E. H.) on sprue, 193.

Young and Hamilton on human and bovine tuberculosis, 572.

ZEISSLER (J.) on lichens planus, 421; on x-rays in skin diseases, 447.

Zomotherapy, 505.

Zymosis gastrica, 177.



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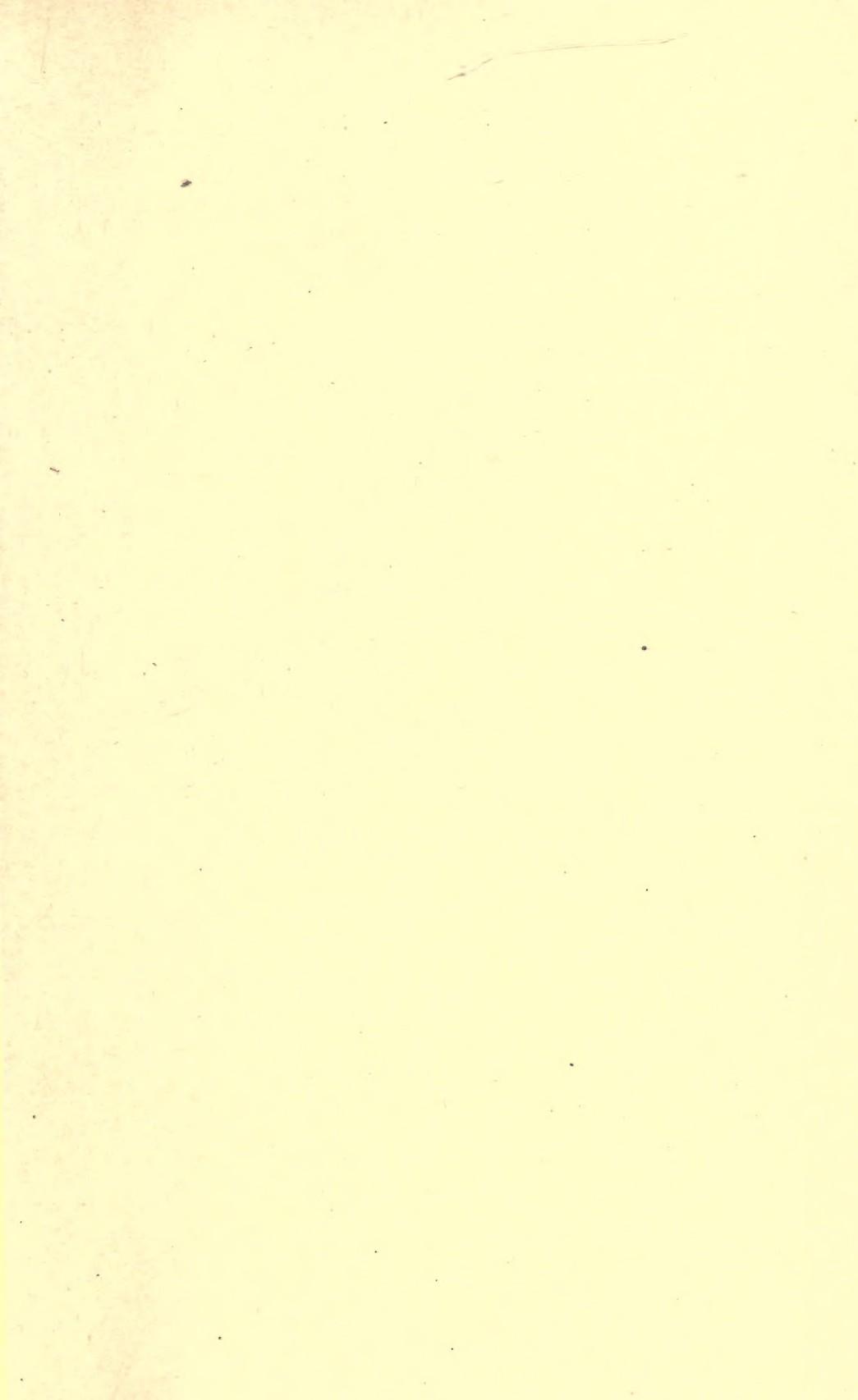
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